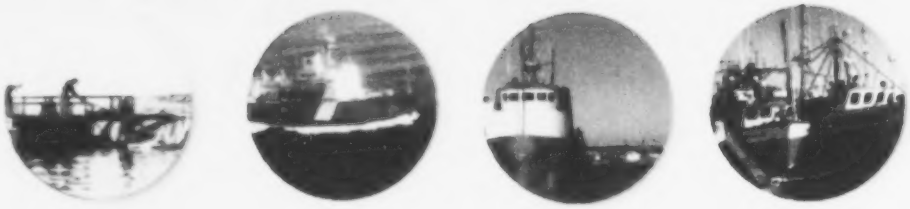
January 2005

# Economic value of the Nova Scotia Ocean Sector



Canada

Nova Scotia Fisheries Sector Council

NOVA SCOTIA

105-05321/

# *Economic Value of the Nova Scotia Ocean Sector*

***Prepared for***

Government of Canada / Gouvernement du Canada

**Fisheries and Oceans Canada**
**Atlantic Canada Opportunities Agency**
**Industry Canada**
**Environment Canada**

NOVA SCOTIA / NOUVELLE-ÉCOSSE

**Office of Economic Development**
**Department of Agriculture and Fisheries**
**Department of Energy**
**Department of Finance**

Nova Scotia Fisheries Sector Council

***Study Team***

***Michael Gardner, Robert Fraser and Mike Milloy,***
***Gardner Pinfold Consulting Economists Ltd., Halifax, Nova Scotia***
***mgardner@gardnerpinfold.ca***

***James Frost,***
***MariNova Consulting Ltd., Halifax, Nova Scotia***

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Justin Huston (Provincial Co-Chair), Fisheries and Aquaculture Services, NS Dept of Agriculture and Fisheries.

Andre Massicotte, Strategic Initiatives, NS Office of Economic Development.

Brenda Bradford, Programs, Atlantic Canada Opportunities Agency.

Gail Edwards, Policy Unit, Atlantic Canada Opportunities Agency.

Lisa Anderson, Nova Scotia Fisheries Sector Council.

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Randy Jewers*, Planning and Evaluation, Human Resources and Skills Development Canada.

Melinda Podor, Market and Industry Services Branch, Agriculture and Agri-Food Canada.

Doreen Liew*, Fisheries Management Branch, Fisheries and Oceans Canada.

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# SUMMARY

## Overview

Activities dependent on the ocean make a substantial contribution to the Nova Scotia economy. This study provides an estimate of the value of these activities. By improving our understanding of the role of the ocean in the economy, decision-makers are placed in a stronger position to develop sound policies aimed at protecting the marine environment, supporting sustainable activities and communities, and providing leadership in ocean stewardship.

The ocean economy encompasses all private sector activities with a direct dependence on the ocean or ocean resources. This includes extractive uses (e.g., fishing, oil and gas production) as well as non-extractive dependence (e.g., shipbuilding, transportation). It also includes public sector organizations and agencies with direct ocean responsibilities.

The ocean also generates economic value in ways not easily quantified because they are not traded in organized markets. Examples include ocean processes influencing climate and biodiversity, that also provide environmental services such as carbon sequestration and waste recycling and storing. While we recognize these values, the limited resources for this study preclude an attempt at quantification.

Economic impact is measured using key economic indicators including gross domestic product (GDP), employment and household income. The study begins with a measure of direct impact by activity, and then estimates spinoff impacts using the Nova Scotia Input-Output model. The analysis covers the years 1996 to 2001.

## Results

### Overall impacts

The direct GDP impact of the ocean sector in the Nova Scotia economy is estimated at $2.62 billion in 2001, about double the 1996 impact measured at $1.37 billion. This direct impact accounts for about 10% of total Nova Scotia GDP. When spinoff effects of ocean activity in the broader economy are considered, the GDP impact rises to $4.08 billion, just over 15% of total Nova Scotia GDP.

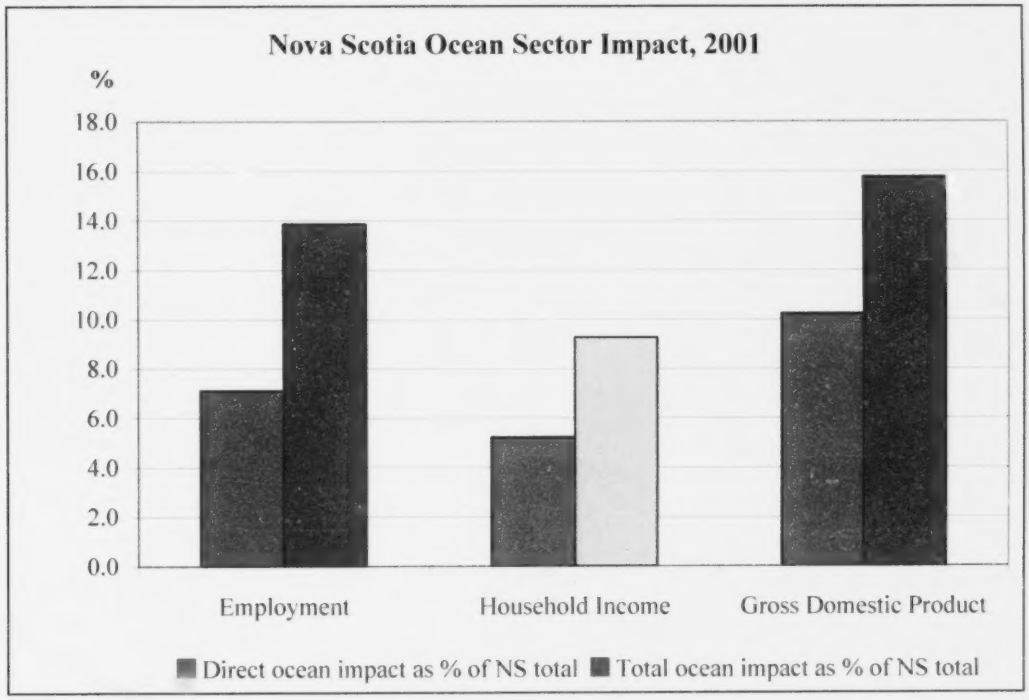
Household income, a major component of provincial GDP, also benefits greatly from ocean activity. Just over 5% of provincial household income is attributable to direct ocean activities. The impact rises to over 9% when spinoff effects are included.

Employment impacts are similarly impressive. With the equivalent of just over 30,000 direct full-time jobs created, the ocean sector accounts for about 7% of total provincial employment. The impact rises to just under 14% when spinoff effects are included.

The impacts are summarized in Figure S-1.

**Figure S-1**
**The Ocean Economy in 2001**
**Summary of Nova Scotia Impacts**

| | Direct Ocean Impact | | | Total Ocean Impact | | |
|---|---|---|---|---|---|---|
| | Impact | NS total | % of NS total | Impact | NS total | % of NS total |
| GDP ($millions) | 2,619 | 25,940 | 10.1 | 4,083 | 25,940 | 15.7 |
| Household Income ($millions) | 1,180 | 23,175 | 5.1 | 2,146 | 23,175 | 9.3 |
| Employment (FTE) | 30,123 | 423,300 | 7.1 | 58,677 | 423,300 | 13.9 |




Gardner Pinfold

## Key Ocean Activities

The fishing industry (including both fishing and processing) and offshore oil and gas dominate ocean activities at the direct level, accounting for a combined total of 60.8% of ocean GDP. The shares of employment and household income, while substantial, are lower at 37.7% and 23.8%, respectively. The relatively high GDP impact (arising mainly from offshore activity) is attributable largely to gas revenues. By definition net revenues are included in the GDP accounting. In the initial stages of an offshore project most of the revenues flow to the investors to recover their investment. As a project progresses, an increasing share of the revenue is retained locally through royalties and corporate income taxes. During the development of an oil and gas project and in the early years of its operation, employment and household income account for most of the economic impact.

The summary of impacts shown in Figures S-2 to S-4 provides interesting insights into the relative importance of activities, and also about differences in the nature of activities and at what point – direct or spinoff – they create their impacts.

- Offshore oil and gas leads activities in GDP impact, with most of the impact occurring at the direct level. This reflects the current dominance of returns to and of capital and the limited activity occurring in the economy during the offshore production phase. The offshore ranks fifth in employment and household income impact.

- The fishing industry (harvesting and processing) ranks second in GDP impact, with much of the impact occurring at the spinoff level. This is because commercial fishing is picked up as an indirect activity for fish processing. The importance of the fishing industry to Nova Scotia is clear: it leads all other sectors in employment and ranks second to National Defence in its income impact.

- National Defence is the leading government agency, ranking third overall in terms of GDP impact, second by employment, and first in income. The role of the military is substantial in Nova Scotia, with the province home to Canada's largest base, CFB Halifax.

- Fisheries and Oceans ranks fourth in GDP impact, and a distant third in employment and household income.

- The important role played by the Port of Halifax as a gateway for shipping to central North America is evident from the relatively high impact attributable to ports and shipping. While ranking fifth overall in terms of contribution to GDP, it ranks fourth in terms of employment and income generated.

- Shipbuilding and boatbuilding, marine construction, marine manufacturing and aquaculture occupy the middle ground in terms of GDP, employment and income impacts. Smaller federal and provincial departments and ocean research, complete the sector.

- Special comment needs to be made about the relative position of ocean tourism. We believe this is a conservative estimate of the role tourism plays in the ocean economy. The contribution to GDP, employment and income shown here captures only the effects of the cruise ship industry and saltwater recreational fishing. The impact of coastal tourism is not included because reliable data for the various activities comprising this segment are not available. This is a major gap, and one that should be addressed by the departments concerned.

**Figure S-2**

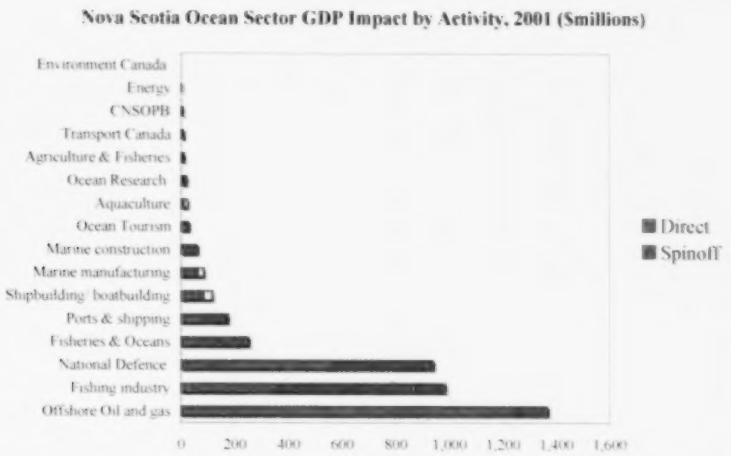



**Figure S-3**

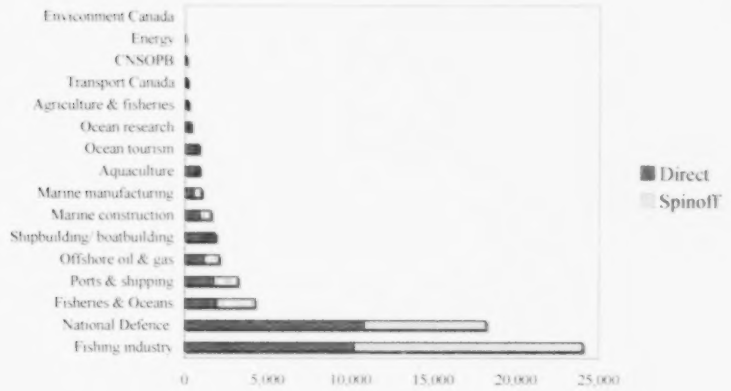
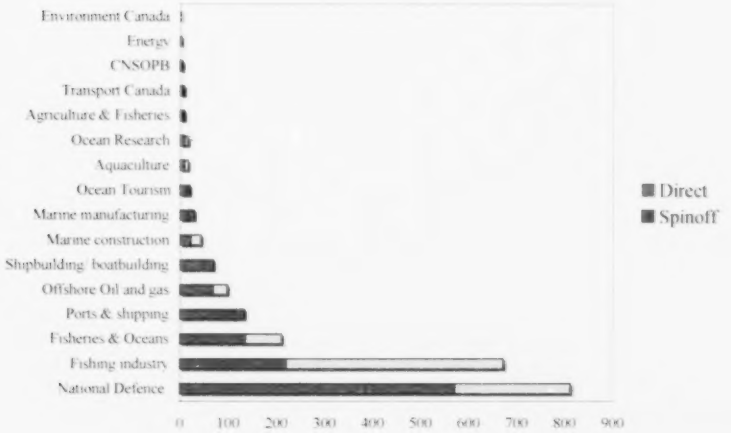


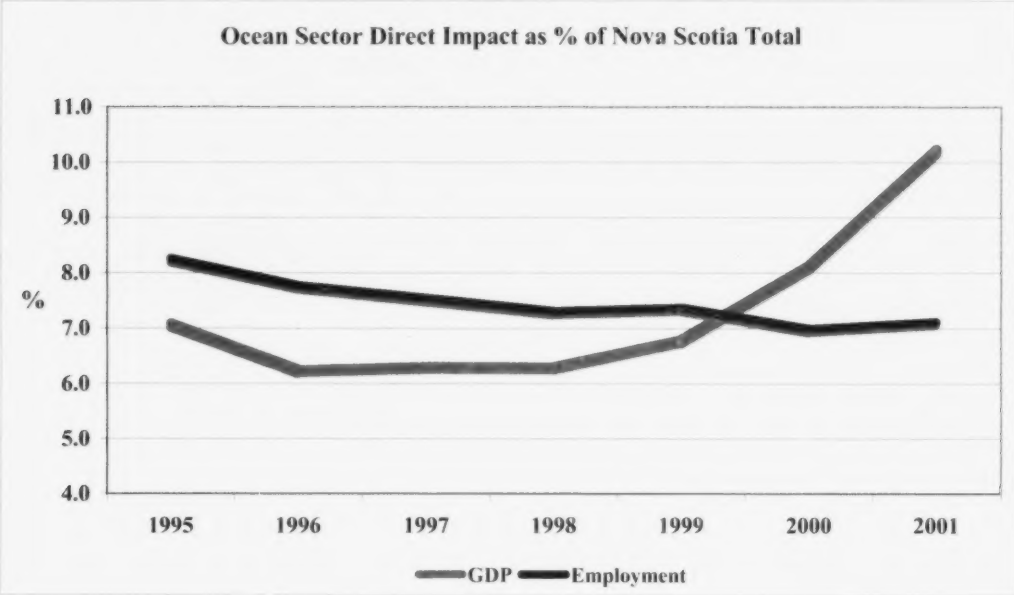

**Figure S-4**



## Ocean Impact Over Time

The relative economic importance of the ocean sector declined slightly during the 1990s due mainly to cuts in key federal departments (Figure S-5). The sharp rise in direct GDP impact after 1999 is due mainly to revenues from offshore gas production, and also improved conditions in the fisheries. Employment generated by ocean activities increased slightly less than total employment in the province in the mid-1990s, and then matched provincial growth after 1999.

**Figure S-5**



# I

# INTRODUCTION

## 1. WHY STUDY THE OCEAN ECONOMY

Activities dependent on the ocean make a substantial contribution to the Nova Scotia economy. Naval installations and the fisheries provided the rationale for European settlement. Shipbuilding and marine transportation followed, providing the basis for economic development and growth. These ocean activities defined settlement patterns that continue to this day.

New activities emerged over the years: tourism, aquaculture, bio-technologies and oil and gas exploration and development. These present substantial opportunities as well as challenges for more traditional uses. A specialized public administration has evolved to provide stewardship leading to sustainable use. Objectives and guidance are embedded in the 1997 *Oceans Act*, with a full vision spelled out in 2002 in *Canada's Ocean Strategy*.

This study finds its rationale against this backdrop of on-going change in ocean activities and the need for careful management. It seeks to gain greater insight into the full range and economic importance of ocean activities in Nova Scotia. By improving our understanding of the role of the ocean in the economy, decision-makers are placed in a stronger position to develop sound policies aimed at protecting the marine environment, supporting sustainable activities and communities, and providing leadership in ocean stewardship.

## 2. STUDY SCOPE

The main objective of this study is to estimate the economic value of ocean-related activities occurring in Nova Scotia (including the waters off Nova Scotia). Within this broad objective are four specific objectives:

- Describe and quantify the various activities comprising the Nova Scotia ocean economy;
- Estimate in a consistent manner the direct and spinoff benefits to Nova Scotia's economy of each component of the ocean economy;
- Discuss each component of the oceans sector in an Atlantic Provinces context; and
- Estimate the growth potential, including strengths and weaknesses, for each component of the ocean sector in Nova Scotia.

The ocean economy encompasses all private sector activities with a direct dependence on the ocean or ocean resources, as well as public sector organizations and agencies with direct ocean responsibilities. Economic impact is measured using key economic indicators including gross domestic product (GDP), employment and household income. The study begins with a measure of direct impact by activity, and then estimates spinoff impacts using an input-output model. The analysis covers the 1996-2001 period.

# 3. CONTENTS

The analytical framework for the study appears in Chapter II following the Introduction. It sets out in detail what is included in the ocean economy and outlines the methodology used to estimate impacts. The framework concludes with a discussion of data requirements, sources and issues.

Chapter III contains the estimates of direct economic impact of ocean activities. These are presented on an industry basis for the private sector, and on a departmental or agency basis for public sector organizations.

Chapter IV extends the analysis to incorporate the broader economic impacts of ocean activities. It presents the results of running the direct impacts through an input-output model, providing so-called spinoff impacts. The relative importance of the ocean economy is assessed through a comparison with provincial totals for corresponding indicators.

Finally, the report examines the Nova Scotia ocean economy in a regional context by comparing the nature and scope of activities by province, including a profile of the strengths and weaknesses of the ocean sector in the region. The report concludes with an assessment of the growth potential of each component of the ocean sector.

# II

# METHODOLOGY

## 1. WHAT CONSTITUTES THE OCEAN ECONOMY

This study is concerned with measuring the contribution to a specified place of economic activity associated with or arising from ocean use. More specifically, the study concerns itself with determining the economic impact of ocean *activity* on a defined ocean region, in this case, Nova Scotia. The economic importance of these activities is measured using a methodology consistent with a national income accounts approach to valuation. This approach requires the use of such indicators as provincial gross domestic product (GDP), employment, household income and expenditures for the activities in question.

The study is *not* about quantifying the value of ocean resources *in situ* – the value of fish in the sea and oil and gas under the seabed. Nor is it about capturing non-market values arising from the ocean's broad regulatory functions. These latter values arise from the ocean as an ecosystem generating natural environmental services including:

- Regulate coastal climate;
- Support for ocean and coastal recreation (a day at the beach, experiencing wildlife);
- Transformation, detoxification and sequestration of pollutants (agricultural run-off) and wastes (urban sewage);
- Global materials recycling (the ocean as a carbon sink regulating atmospheric composition); and
- Maintaining biodiversity.

Capturing non-market values, while highly desirable, lies beyond the scope of this study and would also extend the current capabilities of the framework of national income accounts.

Deciding what activities to include in the ocean economy is driven first and foremost by the relationship to the ocean. The activity must be tied *directly* to the ocean in a primary sense. This means that the ocean provides the direct basis for the activity, or the particular form the activity takes. This includes such obvious sectors as fishing, aquaculture, offshore oil and gas, shipping and coastal tourism. It also captures government services including national defence (ocean based), fisheries management, coast guard and marine environmental protection.

Defining the scope of the ocean economy this way does not exclude indirect or intermediate activities, but recognizes that such activities also serve a wider set of demands. For example, communications, insurance and a range of business services support ocean activities as well as other industries. Whether to include or exclude these becomes in part a question of where to draw the line, but it also stems from formidable data problems in estimating the extent of ocean activity. The extent and impact of these indirect activities is best addressed through the use of input-output models.

Tourism presents its own challenges, part boundary and part data. The boundary problem stems from the wide definition of tourism activities, where the ocean may provide the basis for only part of the demand for a given service. Hotels and restaurants, even ones along the coast, do more than serve demand linked to ocean activities. The lack of reliable data generally for the tourism sector also frustrates the task of estimating the ocean component. Using broad industry averages results in the risk of either overestimating or underestimating economic impacts.

The list of activities included in this study is set out in Table 1 using the North American Industrial Classification System (NAICS). This list is consistent with that used as the basis for estimating the impact of ocean industries at the national level.[1]

- Some industries are specific to marine activity including fishing, marine construction, offshore oil and gas (exploration, development and production), ship and boat building and repair, and marine transportation (including shipping, port operations and support services).

- Others, such as tourism, cross sectors, while others such as manufacturing (e.g. electronics) and professional services (e.g., legal, accounting, insurance) may be only partially involved in oceans activities. For tourism, we focus on three distinct segments: recreational fishing, cruise ship and coastal tourism (ranging from kayaking to whale watching).

- The activities of the federal, provincial and municipal government departments, as well as oceans research and development activities are included, though they are not classified in NAICS in ways that provide a path to reliable data.

**Table 1**
**Ocean Economy Sectors and Industries by SIC and NAICS Codes**

| | Industry | NAICS Code | NAICS Industry (1997 NAICS) | SIC Code | SIC Industry (1987 SIC) |
|---|---|---|---|---|---|
| **Living Resources** | Fish hatcheries & aquaculture | 112511 | • Finfish farming & fish hatcheries | 0273 | • Animal aquaculture |
| | | 112512 | • Shellfish farming | 0921 | • Fish hatcheries & preserves |
| | Fishing | 114111 | • Finfish fishing | 0912 | • Finfish fishing |
| | | 114112 | • Shellfish fishing | 0913 | • Shellfish fishing |
| **Mining/offshore oil & gas** | Limestone, sand & gravel | 212321 | • Construction sand and gravel mining | 1422 | • Crushed & broken limestone |
| | | 212322 | • Industrial sand mining | 1442 | • Construction sand & gravel |
| | | | | 1446 | • Industrial sand |
| | Oil & gas exploration & production | 211111 | • Crude petroleum & natural gas extraction | 1311 | • Crude petroleum & natural gas |
| | | 213111 | • Drilling oil/gas wells | 1321 | • Natural gas liquids |
| | | 213112 | • Support activates for oil & gas operations | 1381 | • Drilling oil & gas wells |
| | | 541360 | • Geophysical exploration & mapping services | 1382 | • Oil & gas field exploration services |
| | | | | 1389 | • Oil & gas services nec |

[1] RASCL, *Canada's Ocean Industries: Contribution to the Economy, 1988-2000.*

**Table 1 (Cont'd)**
**Ocean Economy Sectors and Industries by SIC and NAICS Codes**

| | Industry | NAICS Code | NAICS Industry (1997 NAICS) | SIC Code | SIC Industry (1987 SIC) |
|---|---|---|---|---|---|
| **Manufacturing** | Seafood processing | 311711 | • Seafood canning | 2077 | • Animal & marine fats & oils |
| | | 311712 | • Fresh and frozen seafood processing | 2091 | • Canned & cured fish & seafoods |
| | | | | 2092 | • Fresh & frozen fish & seafoods |
| | Boat building & repair | 336612 | • Boat building & repair | 3732 | • Boat building & repair |
| | Ship building & repair | 336611 | • Ship building & repair | 3731 | • Ship building & repair |
| | Search & navigation equipment | 334511 | • Search, detection, navigation, guidance, aeronautical/nautical system & instrument manufacturing | 3812 | • Search, detection, navigation, guidance, aeronautical/nautical system & instrument manufacturing |
| **Construction** | Marine related construction | 237120 | • Oil and gas pipeline and related structures | 1629 | • Heavy construction not elsewhere classified |
| | | 237990 | • Other heavy & civil engineering const'n | | |
| **Tourism & recreation** | Recreational fishing | n.a. | • Marine recreational fishing | | |
| | Coastal tourism | 487210 | • Scenic & sightseeing transportation, water | | |
| | Cruise ship | 483112 | • Deep sea passenger transportation | 4481 | • Deep sea transportation of passengers except by ferry |
| **Ports and shipping** | Deep sea freight | 483111 | • Deep sea freight transportation | 4412 | • Deep sea foreign transportation of freight |
| | | 483113 | • Coastal & Great Lakes freight transportation | 4424 | • Deep sea domestic transportation of freight |
| | | | | 4449 | • Water transportation of freight not elsewhere classified |
| | | 483114 | • Coastal & Great Lakes passenger transportation | 4482 | • Ferries |
| | | | | 4489 | • Water transportation of passengers n.e.c. |
| | Marine transportation services | 488310 | • Port & harbour operations | 4491 | • Marine cargo handling |
| | | 488320 | • Marine cargo handling | 4492 | • Towing & tugboat services |
| | | 488330 | • Navigational services to shipping | 4499 | • Water transportation services not elsewhere classified |
| | | 488390 | • Other support activities for water transportation | | |
| | Warehousing | 493110 | • General warehousing & storage | 4225 | • General warehousing & storage |
| | | 493120 | • Refrigerated warehousing & storage | 4222 | • Refrigerated warehousing & storage |
| | | 493130 | • Farm product warehousing & storage | 4221 | • Farm product warehousing & storage |

http://www.statcan.ca/english/Subjects/Standard/naics/1997/naics97-index.htm; RASCL, *Canada's Ocean Industries: Contribution to the Economy, 1988-2000.*

# 2. METHODOLOGY

The importance of ocean activities is measured using conventional economic indicators consistent with the national income accounting framework. This framework takes GDP as the basic measure of the value of each economic activity (ocean industry/service), where GDP represents the total market value of goods and services produced for final consumers. GDP may also be measured as the sum of value-added (income) at each stage of production. Employment, as measured in full-time equivalent (FTE) jobs, and sales revenue by industry are also reported.

For government services, the contribution to GDP is equivalent to payroll (income). Other components of value added (profit and return of capital) are not relevant since departments and agencies do not operate on a commercial basis.

GDP and employment provide the measure of ocean activity at the direct level. But the overall economic impact is greater than this. Indirect activities supporting ocean industries and services, as well as on-going rounds of spending by those employed in direct and indirect activities, add to the impact. These indirect and induced impacts are estimated using the 1996 version of the Nova Scotia Input-Output Model (NSIO).

GDP, employment and other direct economic data are compiled and reported on an industry basis. Where the value of output of one industry provides the input for another, simply summing the value of output of both to arrive at overall impact (direct, indirect and induced) would result in double counting. Fishing and fish processing represent the best example. Though commercial fishing is an industry in its own right and makes a substantial contribution to value added in Nova Scotia, most of its output is purchased by the processing sector. We avoid double counting by including in the fishing impact estimates only activity not captured by the processing sector.

The study covers the 1996-2001 period. Annual data are compiled for each industry and service, though some gaps exist due to data limitations. The overall impacts of each ocean activity are estimated separately using the NSIO, with impacts reported on an annual basis. Comparing aggregate (all activities) overall impact values with provincial totals for corresponding indicators (GDP, employment) provides a measure of the relative importance of the ocean economy.

# 3. DATA SOURCES AND ISSUES

The study relies heavily on Statistics Canada to meet the data needs. This increases the likelihood that the study meets three key criteria: consistency (the same methods and assumptions are used to collect and report data), comparability (data are consistent over time and across industries), and replicability (the study can be updated periodically, allowing time series measures of the ocean economy).

While excellent data sets are available for several industries, three areas of weakness exist.

- Access to data is constrained for some industries in some years due to confidentiality where there are small numbers of firms in Nova Scotia. Shipbuilding is an example.
- Data may not be available for the ocean component of an industry serving a wider set of demands. Construction serves as a good example, where the marine component of non-residential construction is not identified separately.
- Also, some ocean activities confound conventional data gathering methods because they do not conform to standard industry classifications. Tourism is the best example.

Various approaches are used to address shortcomings with the data including extrapolation and interpolation from trends, and applying industry coefficients to known values to fill gaps. A complete description of the approaches used (by industry or activity) is set out in the following chapter. Data sources are identified in Table 2.

**Table 2**
**Oceans Economy Impact Study: Data Sources**

| Ocean activity | Source | Comment |
|---|---|---|
| **Commercial Fisheries** | ▪ Statistics Canada | ▪ Detailed breakdown of GDP; some adjustments required |
| | ▪ Fisheries and Oceans | ▪ Industry landings & employment |
| **Aquaculture** | ▪ Fisheries and Oceans | ▪ Detailed breakdown of GDP. No adjustments needed. |
| **Seafood processing** | ▪ Statistics Canada | ▪ Detailed breakdown of GDP; some estimating required to fill gaps |
| | ▪ NS Agriculture & Fisheries | ▪ Industry licencing data |
| **Oil and gas** | ▪ Statistics Canada<br>▪ NS Department of Energy | ▪ Limited data due to confidentiality<br>▪ Background reports provide basis for making direct impact estimates |
| **Ports and shipping** | ▪ Statistics Canada<br>▪ Transport Canada<br>▪ Halifax Port Authority | ▪ Limited GDP data<br>▪ Industry data (vessels, tonnages)<br>▪ Studies provide basis for estimates |
| **Tourism** | ▪ NS Department of Tourism | ▪ Cruise ship data provided; coastal tourism indicators estimated |
| | ▪ Fisheries and Oceans | ▪ Detailed recreational fishing data |
| **Ship & Boatbuilding** | ▪ Statistics Canada | ▪ Detailed breakdown of GDP; some estimating required to fill gaps |
| **Manufacturing** | ▪ Statistics Canada | ▪ Breakdown of GDP for one year only. Estimating required to fill gaps |
| | ▪ Industry Canada | ▪ Industry overview |
| **Marine construction** | ▪ Fisheries and Oceans<br>▪ Dep't of National Defence | ▪ Value of construction projects by year<br>▪ Value of construction projects by year<br>▪ Impact indicators estimated |
| **Ocean research** | ▪ Fisheries and Oceans<br>▪ National Research Council<br>▪ Dalhousie University | ▪ Included with total departmental data<br>▪ Annual expenditures and employment<br>▪ Department of Oceanography data |
| **Government services** | ▪ Federal Departments<br>▪ Provincial Departments | ▪ Budget, salaries and employment<br>▪ Budget, salaries and employment |

# III

# PERFORMANCE OF THE OCEAN ECONOMY

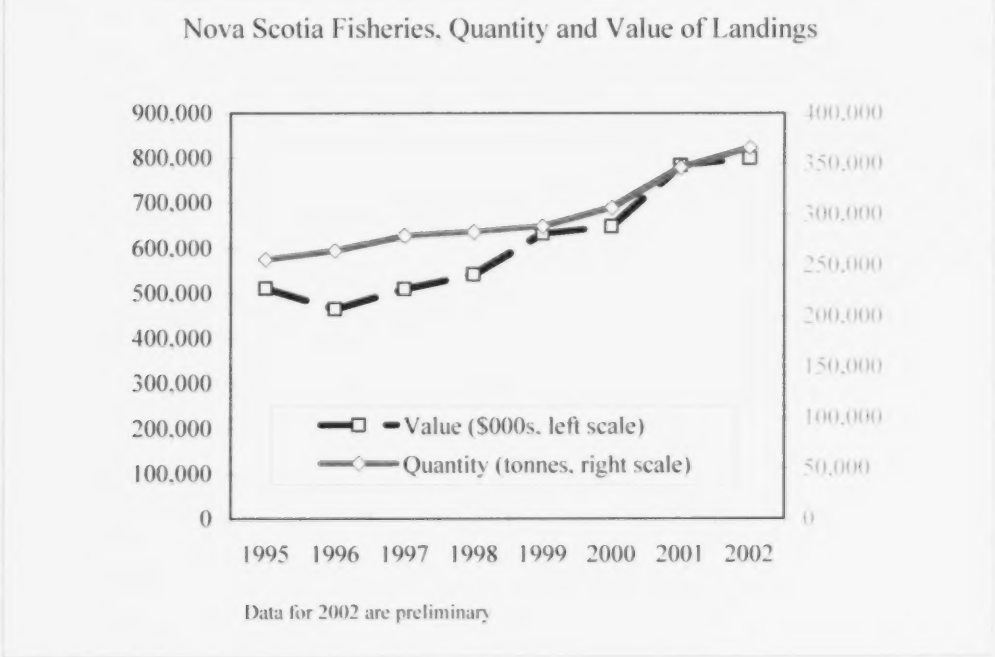
## 1. COMMERCIAL FISHERIES

### Fishing Operations

The Nova Scotia fishing industry (harvesting and processing) is a major source of direct and indirect employment and income, and is the province's leading source of export earnings. An important element of the industry's economic significance derives from its rural location. Fishing and fish processing, together with the industries dependent on them, form the economic base for many of Nova Scotia's coastal communities.

Nova Scotia's fishing industry derives its strength from an abundant and diverse resource base. The industry faced considerable turmoil during the early 1990s, with the collapse of groundfish stocks, but recovered during the second half of the decade. By the early 2000s, the value of landings had reached $800 million (Figure 1), with the value of final production exceeding an estimated $1.5 billion.[2]

**Figure 1**




Source: Department of Fisheries and Oceans

[2] Final product value is estimated on the understanding that Nova Scotia export sales ($1,235 million in 2002) represent about 80% of product value.

The commercial fishery targets over 30 species. Shellfish is the main species group, with lobster, scallop, snow crab and shrimp the main species. In 2002, shellfish accounted for 84% of landed value. Groundfish continues to play a significant role (11% of landed value), though much diminished from the 1970s and 1980s, when this species group accounted for over 50% of landed value. Cod, haddock, flatfishes and hake are the leading species. Within the pelagic group (5% of landed value), herring, swordfish and tuna are the main species. The quantity and value of landings by species group are shown in Figures 2 and 3.

**Figure 2**

**Nova Scotia Fisheries, Quantity Landed, 1995-2002 (tonnes)**

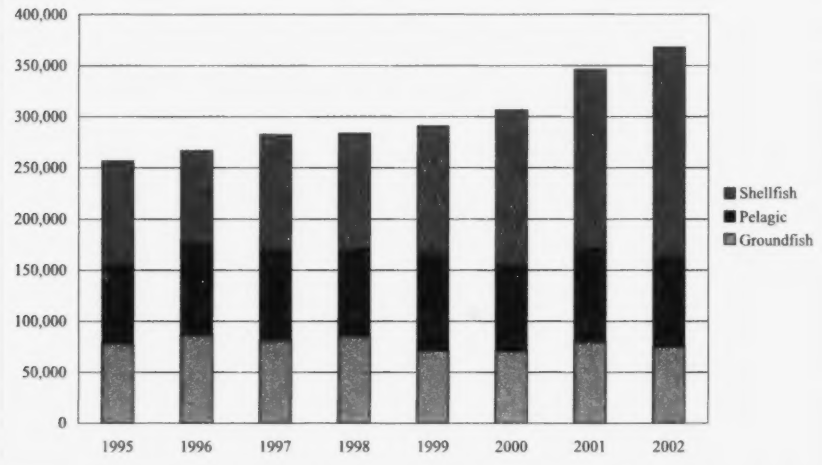
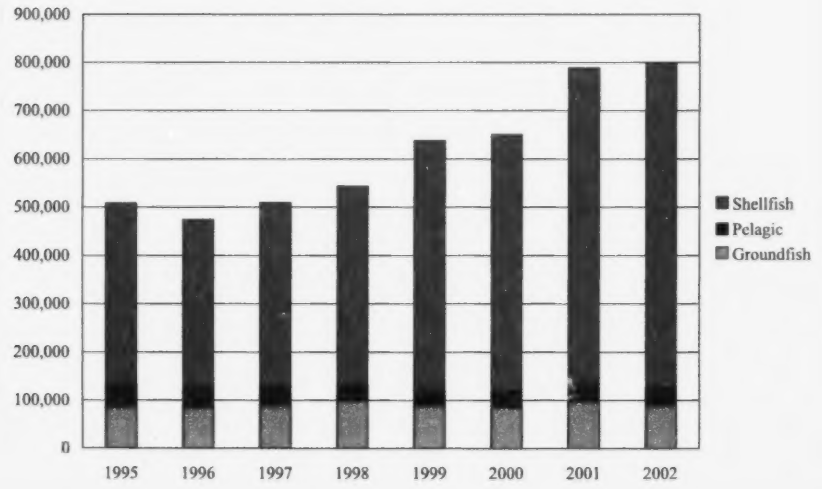



**Figure 3**

**Nova Scotia Fisheries, Value of Landings, 1995-2002 ($000s)**




Source: Department of Fisheries and Oceans 2002 data are preliminary

The harvesting sector, comprised of some 5,450 vessels, of which over 5,350 are classified as inshore boats (less than 20 m), operated by 2-4 crew-members. They fish mainly lobster, groundfish, crab and shrimp, most operating between 6 and 9 months. Regulation, resource availability and weather determine the length of the fishing year. The 70 or so offshore vessels (greater than 30 m) fish for scallop on Georges Bank, Arctic surf clam on the Scotian Shelf, and northern shrimp off Newfoundland and Labrador. These vessels take crews ranging from 15 to 30, with most operating 10-12 months. The mid-shore and inter-tidal sectors round out the fishery. The small mid-shore fleet (30 vessels between 20 and 30 m) targets groundfish and pelagic species.

The size of the fleet declined through the 1990s as vessel owners adjusted to groundfish collapse and lower earnings. Vessel owners began to respond to improving conditions in the fishery (rise in shellfish landings and better markets) in 2000 by replacing vessels and also investing in additional ones (Table 3). To allow greater flexibility in their harvesting operations, many core licence-holders own more than one vessel.

A similar pattern of decline and recovery occurred with licence-holders. The number of core licence-holders (essentially, professional harvesters eligible to hold limited entry licences) declined in the early 1990s before stabilizing in the 3,500 range. The number of non-core licence-holders (mainly part-time registered harvesters serving as crew members) has stabilized in the 10,500-11,000 range (Table 3).

**Table 3**
**Nova Scotia Vessels and Licence Holders, 1995-2002**

| | Vessels | Core licence-holder | Non-Core licence holder | Full-time equivalent (2) |
|---|---|---|---|---|
| 1995 (1) | 5,681 | n.a. | n.a. | 7,500 |
| 1996 | 5,350 | 4,011 | 11,234 | 7,500 |
| 1997 | 5,231 | 3,804 | 10,515 | 7,500 |
| 1998 | 5,121 | 3,774 | 10,229 | 7,500 |
| 1999 | 4,996 | 3,608 | 10,345 | 7,500 |
| 2000 | 5,473 | 3,555 | 10,449 | 7,500 |
| 2001 | 5,607 | 3,538 | 10,503 | 7,500 |
| 2002 | 5,452 | 3,546 | 11,012 | 7,500 |

Source: Department of Fisheries and Oceans

Note: 1. Different criteria were used to designate licence-holders prior to 1996. The data are non-comparable with the core and non-core designations.

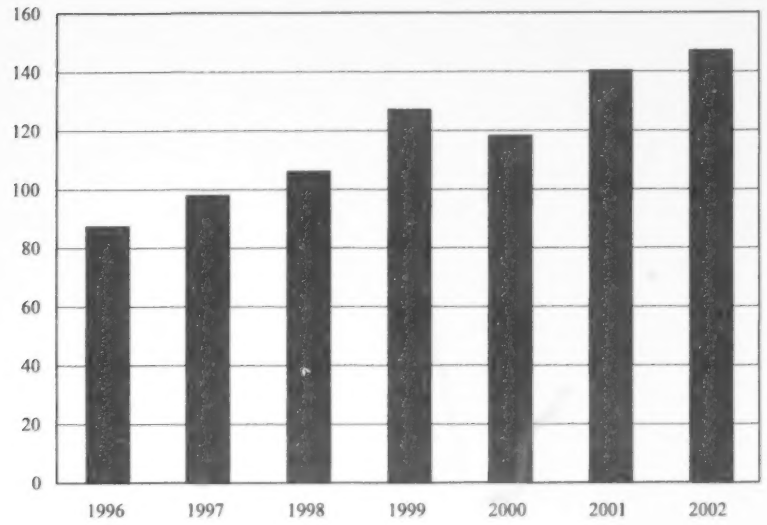
2. These estimates are derived using fisheries data (vessel operations by gear class, crew size and season length), with reference to employment insurance claimant data and 2001 Census occupational data.

Official estimates of full-time equivalent employment are not compiled for fisheries due mainly to the challenges in defining and measuring employment as conventionally defined (paid hours of work). The estimate in Table 3 is derived by multiplying the number of vessels by gear type, duration of fishing season, and typical crew size. Seasonal harvesting data over the years give no indication that the number of FTEs varies significantly by year, so a single figure (7,500) is used for the 1995-2002 period.

Increased abundance of higher valued species and improved markets, coupled with stability in the number of vessels, have resulted in a substantial increase in average gross revenue. Figure 4 shows this increased by about 68% between 1996 and 2002, rising from $87,000 to $146,000.

**Figure 4**

**Nova Scotia Landed Value per Vessel, 1996-2002 ($000s)**




Source: Figure 3 and Table 3

## Economic Contribution

The relative importance of marine fisheries in the Nova Scotia economy has increased gradually over the past decade, with the contribution to GDP rising from $235 million in 1995 to just under $340 million (current dollars) in 2002. Employment as measured in full-time equivalents (FTE) has remained stable at an estimated 7,500. Limited entry licencing, seasonal limits, quotas and weather determine the duration of employment. Applying these factors to the harvester data in Table 3 provides the basis for the estimate.

Marine fisheries landings are sold either to local processors or exported directly. Industry Canada data shows that direct exports attributable to the fisheries sector has more or less followed the pattern of landings, rising from $389 million in 1995 to $565 million in 2002. Much of this export value is accounted for by lobsters (sold live), and also such species as northern shrimp and scallops, where all or most of the processing occurs on the harvesting vessel.

The contribution of the fishery to household income increased by almost half between 1995 and 2002, rising from $128 million to just under $185 million. With stability in the number of harvesters and FTEs, this means that average incomes also increased substantially, rising from about $17,000 to about $25,000 per year. With the great differences in value of the various fisheries in the province, there would be considerable variation around this average.

The contribution made by the fisheries sector to the Nova Scotia economy is summarized in Table 4.

**Table 4**
**Commercial Fisheries Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports (5) $000s | Income (6) $000s |
|---|---|---|---|---|---|---|
| 1995 | 512,200 | 235,612 | 7,500 | 512,000 | 389,217 | 128,000 |
| 1996 | 466,000 | 214,360 | 7,500 | 466,000 | 388,271 | 116,500 |
| 1997 | 512,000 | 235,520 | 7,500 | 512,000 | 389,578 | 128,000 |
| 1998 | 543,000 | 249,780 | 7,500 | 543,000 | 410,756 | 135,750 |
| 1999 | 634,000 | 291,640 | 7,500 | 634,000 | 457,714 | 158,500 |
| 2000 | 648,000 | 298,080 | 7,500 | 648,000 | 525,963 | 162,000 |
| 2001 | 785,000 | 361,100 | 7,500 | 785,000 | 529,306 | 196,250 |
| 2002 | 799,000 | 367,540 | 7,500 | 799,000 | 565,386 | 199,750 |

Source: Department of Fisheries and Oceans, Statistics Canada, Industry Canada. GDP, employment (FTE) and household income are estimated by Gardner Pinfold using industry data.

Notes:
1. Assumes all of sales revenue is spent on operating inputs including labour, materials, services and return to and of capital.
2. GDP is estimated based on 1997 relationships among the various elements comprising value added.
3. See Table 3.
4. This is taken as the value of landings.
5. Exports for primary fishing are provided by Industry Canada trade data.
6. Household income (crew payments and skipper income) is derived from a special tabulation by Statistics Canada.

# 2. AQUACULTURE

## Operations

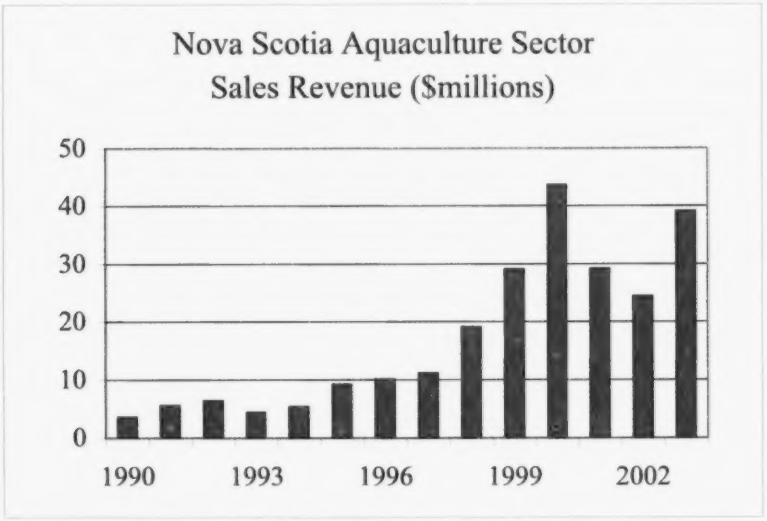
The coastal waters of Nova Scotia support some 400 aquaculture sites (not all in production), producing a range of finfish and shellfish species. The industry is comprised mainly of independent producers operating on a relatively small scale. Even the province's larger salmon and mussel farms tend to be smaller than their New Brunswick and PEI counterparts. Industry data gathered by the Nova Scotia Department of Agriculture and Fisheries indicates that 25-30% of aquaculture workers are full-time employees, the balance part-time and seasonal.

Production tends to be concentrated in few farms. Provincial aquaculture officials estimate that fewer than 20% of farms account for over 80% of production. For a variety of reasons, many of the sites (oyster in particular) are not in production.

The main species are salmon (Atlantic and steelhead account for two-thirds of total value), blue mussel and American oyster. Developing species include Arctic Char, halibut, scallop, striped bass, quahog and European oyster. In 2003, about 8,000 tonnes of product were shipped, with a total value of just under $40 million. Included in the revenue figure is the hatchery output, with about $4.5 million in sales.

The aquaculture sector started slowly in the early 1980s, with moderate growth into the early 1990s. It expanded rapidly after 1995, achieving a five-fold increase in the value of production (attributable mainly to salmon and steelhead). There followed two years of decline (attributable mainly to the failure of a large trout producer), with a recovery in 2003. Sales revenue, 1990-2003, is given in Figure 5.

**Figure 5**




Source: Nova Scotia Department of Agriculture and Fisheries

The sector faces several challenges that, in combination, act to inhibit development and growth:

- **natural limitations:** though the province has 7,000 km of coastline and an abundance of sheltered inlets and bays, it also has a temperature regime whose extremes are at worst lethal, and at best lie outside the optimum for efficient growth of key species such as salmon, steelhead and American oyster. Culture of these species is naturally confined to a very few areas with limited carrying capacity. Water quality is also an issue in some coastal areas.

- **technological and knowledge gaps:** other than salmon, steelhead and mussels, culture techniques and growth parameters for key species (e.g., scallop, European oyster) would be considered in the development stage.

- **hostile public environment:** prospective growers face considerable opposition from established fishing interests (mainly lobster licence-holders) who fear a loss of fishing grounds, and from coastal land-owners who object on aesthetic grounds. This constrains access to some of the better areas.

- **dilution of research and support:** while a diversity of species may to some imply a diversity of opportunity, it seems also to have led to a dilution of research and development funds resulting in inadequate attention to any particular species.

- **challenging regulatory regime:** A common refrain amongst growers concerns the length of time it takes to obtain a lease – periods of 2-3 years are not uncommon. Some of the best sites are inactive or held by those with only a marginal interest in aquaculture.

## Economic Contribution

Aquaculture is still in a developmental stage in Nova Scotia and this is reflected in economic data that show growth, but also wide swings in key results. The contribution to GDP rose four-fold between 1997 and 2000, rising from $5.7 million to just over $21.6 million in 2000. It then dropped precipitously to $10.1 million in 2001 due to the failure of a major producer. Employment (FTE) has fluctuated with production, increasing from 512 in 1997, peaking at 708 in 2000, and then dropping to 529 in 2002.

With a substantial share of salmon production controlled by New Brunswick-based farms, much of the Nova Scotia production is shipped to processing facilities there. Direct exports from Nova Scotia to customers outside Canada are generally in the $5-6 million range, about 25% of the farm gate value.

The industry makes a modest contribution to household income. The figures in Table 5 reflect employed labour only and exclude returns to the enterprise owner. The GDP figures would be a closer approximation to household income.

The contribution made by aquaculture to the Nova Scotia economy is summarized in Table 5.

**Table 5**
**Aquaculture Sector Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports (5) $000s | Income (6) $000s |
|---|---|---|---|---|---|---|
| 1995 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1996 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1997 | 11,200 | 5,690 | 512 | 11,200 | 5,911 | 4,300 |
| 1998 | 19,100 | 9,480 | 700 | 19,100 | 6,181 | 6,500 |
| 1999 | 29,400 | 17,625 | 708 | 29,400 | 5,371 | 8,200 |
| 2000 | 43,500 | 21,600 | 640 | 43,500 | 5,701 | 8,900 |
| 2001 | 29,100 | 10,150 | 628 | 29,100 | 5,736 | 8,300 |
| 2002 | 24,300 | 10,100 | 529 | 24,300 | 3,544 | 6,600 |
| 2003 | 35,166 | 17,231 | 700 | 35,166 | 5,626 | 8,790 |

Source: Statistics Canada, Department of Fisheries and Oceans, Nova Scotia Department of Agriculture and Fisheries.

Notes:
1. Assumes all of sales revenue is spent on operating inputs including labour, materials, services and return to and of capital.
2. GDP is from DFO Statistical Services, *Value Added Account Aquaculture Industry*.
3. Employment as measured in full-time equivalents (FTE) is derived from NS Department of Agriculture and Fisheries aquaculture data, with full-time = 1 FTE and part-time = 0.4 FTE.
4. This is taken as the farm gate value of production, excluding hatchery sales (an industry input).
5. Exports from Industry Canada trade data.
6. Household income is from DFO Statistical Services, *Value Added Account Aquaculture Industry*.

# 3. FISH PROCESSING

## Operations

The Nova Scotia fish processing sector consists of 295 licenced plants, with an estimated two-thirds operating in 2004.[3] The sector utilizes some 30 species, producing a wide range of fresh, frozen and value-added products. The number of licenced operations has remained stable since 1997, following a 10-year decline that saw plant numbers drop from a peak of 372 in 1988. Processing plants are concentrated in southwest Nova Scotia and Cape Breton.

The drop in plant numbers and number operating is attributable mainly to the decline in groundfish stocks. In 2002, about 90,000 tonnes of groundfish were landed in the Nova Scotia, down from about 175,000 tonnes in 1990. Though the local groundfish fishery continues to provide raw material for the sector, many plants depend heavily on frozen fish imported from Norway, Iceland and Russia.

Despite the challenges posed by the decline in groundfish, the Nova Scotia processing sector adapted, and by the end of the 1990s, approached the billion-dollar mark in total sales. It has since dropped back, though there has been some growth in employment (to just over 7,000) following several years of stability in the 5,000 range. This is attributable in part to the expansion of the crab processing sector where several new plants have come on stream in Cape Breton.

About 80% of the value of production is exported, mainly to the U.S., Europe and Japan. Lobster, scallop, snow crab and shrimp are the main commodity exports.

## Economic Contribution

The economic importance of fish processing in Nova Scotia increased during the second half of the 1990s, and has since stabilized. The contribution to GDP rose from $173 million in 1995 to peak at just under $300 million (current dollars) in 1999. Employment as measured in full-time equivalents (FTE) fluctuated within the 5,000-5,500 range up to 2000, and then increased to the 7,300 level in 2002.

Industry Canada data shows that exports attributable to fish processing increased by 60% between 1995 and 2002, rising from $430 million to just under $690 million. Scallop, crab, shrimp and surf clam account for much of this export value. Groundfish, particularly cod and haddock, are also significant contributors (though much of the cod is imported, processed and re-exported).

The contribution of fish processing to household income fluctuated within a narrow range between 1995 and 2001, with a low of $104 million in 1996 and a high of $117 million in 2001. The high point came in 2002, with employment growing by just over 1,000 FTE and income reaching about $133 million.

The contribution made by the fish processing sector to the Nova Scotia economy is summarized in Table 6.

[3] Lisa Anderson, Nova Scotia Fisheries Sector Council, pers. com

**Table 6**
**Fish Processing Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports (5) $000s | Income (6) $000s |
|---|---|---|---|---|---|---|
| 1995 | 717,694 | 173,234 | 5,221 | 902,700 | 430,458 | 112,880 |
| 1996 | 681,783 | 204,308 | 4,951 | 894,100 | 446,989 | 104,130 |
| 1997 | 698,236 | 247,700 | 5,000 | 960,500 | 459,341 | 105,960 |
| 1998 | 757,125 | 229,700 | 5,128 | 991,700 | 504,776 | 107,785 |
| 1999 | 764,532 | 296,680 | 5,528 | 993,900 | 558,212 | 118,720 |
| 2000 | 653,877 | 251,940 | 5,579 | 850,000 | 579,591 | 103,178 |
| 2001 | 667,989 | 241,520 | 6,281 | 868,000 | 629,624 | 117,250 |
| 2002 | 655,731 | 272,050 | 7,337 | 852,500 | 689,267 | 132,925 |

Source: Statistics Canada, Industry Canada.

Notes:
1. Includes operations and maintenance spending only.
2. GDP estimates from Statistics Canada, Table 301-0003, *Annual Survey of Manufacturers*.
3. Employment as measured in full-time equivalents (FTE) is from Statistics Canada, Table 301-0003, *Annual Survey of Manufacturers*.
4. From Statistics Canada, Table 301-0003, *Annual Survey of Manufacturers*.
5. Exports for fish processing are from Industry Canada trade data.
6. Household income refers to total salaries and wages from Statistics Canada, Table 301-0003, *Annual Survey of Manufacturers*.

# 4. OFFSHORE OIL AND GAS

## Operations

### Exploration

Exploration consists of seismic surveys and exploration drilling to determine the existence of commercial petroleum reserves in licensed areas. These activities are expensive in offshore areas, with wells on the Scotian Shelf typically costing in the $40-50 million range, and those in deep water off the Shelf costing in the range of $60-80 million. Exploration may be carried out over a long period before a commercial discovery is made (the success rate for exploration wells on the Scotian Shelf is about one in ten). Note that the first major development project in Nova Scotia (Sable) took place in the late 1990s, some 20 years after the discovery well was drilled.

Exploration work is capital-intensive and requires the use of expensive and highly mobile equipment, including seismic vessels, drilling rigs, supply/support vessels and helicopters. Typically, these are owned and operated by specialist multinational companies that undertake exploration for petroleum companies on a contractual basis. Onshore activity to support the offshore is typically concentrated at one shore base, airport/heliport and administrative centre, which may be at considerable distance from the concession blocks being explored.

Activity levels during the exploration phase are highly variable. Experience shows that companies can terminate their efforts for a variety of reasons including poor exploration results, better prospects elsewhere, a global recession in exploration, or an unwillingness to comply with requirements for local preference, taxation and/or environmental protection.

Offshore oil and gas exploration on the Scotian Shelf spans a 40-year period. Mobil Oil Canada received its first offshore license in 1959 for the Sable Island block. Mobil began its first seismic program in 1960 and followed this with a drilling program in 1967.

Up to the end of 2001, the industry had acquired several hundred thousand km of seismic data and drilled some 140 exploration/delineation wells. Drilling activity has varied in intensity over the years, with success the main driver in the number of exploratory wells drilled. Of the 72 exploration and delineation wells drilled during the late 1960s and 1970s, eight resulted in Significant Discoveries.

Combined with incentives under the National Energy Program, this success provided the impetus for another 52 exploration and delineation wells in the 1980s. These resulted in a further 14 Significant Discoveries. Most of these are relatively small, yet potentially economic, gas fields. Exploration activity during the 1990s was relatively light, with nine wells drilled including the Deep Panuke discovery well.

Activity during the 1990s was dominated by field development, with a total of 38 production wells drilled for Cohasset-Panuke and Sable Offshore Energy Project (SOEP). Only six exploration wells were drilled. Activity picked up in 2000, following completion of SOEP. To mid-2004, another 22 exploration and eight production wells have been drilled. Table 7 provides details on the number of wells by type up to 2004. These exploration wells yielded generally poor results.

**Table 7**
**Exploration Activity on the Scotian Shelf, 1960-2003**

| Years | Wells Drilled | | | | Significant Discoveries |
|---|---|---|---|---|---|
| | Exploration | Delineation | Production | Total | |
| 1960-1969 | 3 | - | - | 3 | 1 |
| 1970-1979 | 56 | 13 | - | 69 | 7 |
| 1980-1989 | 39 | 13 | - | 52 | 14 |
| 1990-1999 | 6 | - | 38 | 44 | * |
| 2000-2004 | 22 | 1 | 8 | 31 | - |
| **Total** | **126** | **27** | **46** | **199** | **22** |

* Deep Panuke is not formally designated a significant discovery because the operator holds rights under an earlier exploration licence for the area.

Source: Canada-Nova Scotia Offshore Petroleum Board, *Directory of Offshore Wells, Revised August, 2004.*

The Significant Discoveries (plus Deep Panuke) contain estimated recoverable reserves of just over 170 million cubic meters (six trillion cubic feet) of natural gas, and 35 million cubic meters (220 million barrels) of oil and condensate[4]. The Marathon Annapolis well drilled in 2001-2002 was the first deep water well and encountered enough hydrocarbons to prompt Marathon to state they would be exploring the block further. CNSOPB (2002) estimates deepwater potential to be between 425 and 1,160 million cubic meters (15 and 41 trillion cubic feet) of natural gas. The Nova Scotia Department of Energy estimates total discovered and undiscovered resources to be approximately 1,130 million cubic meters (40 trillion cubic feet).

## *Development*

Field development follows once a gas or oil field or fields have been deemed by the operating companies to be commercially developable. This could occur many years after the discovery because of regulatory, market, financing or engineering considerations. A development project consists of the design, construction and installation of production equipment, including systems to bring the oil and/or gas to shore (this could by tanker or pipeline in the case of oil, or by pipeline in the case of gas). Development also includes the drilling of production wells to extract the hydrocarbons (Table 8). The number of wells depends on the size and geology (porosity and permeability) of the field.

- **Cohasset-Panuke Project:** a relatively small oil project, this was the first offshore development on Canada's East Coast. The project comprised the Cohasset and Panuke fields, discovered in 1973 and 1986, respectively. Development took place in 1991-92. Production began in 1992 and ended in 1999, with the field producing about 45 million barrels of light oil. A shuttle tanker transported oil from a storage vessel moored at the field to refineries. The project had a capital cost of about $500 million and annual operating costs in the $110 million range (Table 8).

- **Sable Offshore Energy Project (SOEP):** a natural gas development consisting of six fields, it is Nova Scotia's first major offshore project. It took many years to reach the development stage. The discovery well forming the core of the project was drilled in 1979. The first attempt to develop these fields (the Venture Offshore Development Project) was halted in 1986, when market conditions proved inadequate.

[4] All conversions are made using 35.3123 cubic feet per cubic meter and 0.158987 barrels per cubic meter.

The project was resurrected in the 1990s as markets strengthened and sufficient gas reserves were brought into play. Engineering commenced in 1997, with field development occurring during 1998-1999. Production commenced in late 1999. The project is being developed in two phases (tiers). Tier 1 ties in three fields (Thebaud, Venture and North Triumph), with average daily production in the range of 400-550 million cubic feet. Tier 2 is underway, with development of Alma and South Venture.

The original estimate of 3.2 trillion cubic feet of recoverable reserves has been downgraded to 1.7 trillion cubic feet because of poor reservoir characteristics. The gas is in place, but it is more costly to recover than originally anticipated. Capital costs for the project are estimated at $3.0 billion, with $2.0 billion spent in Tier 1 and $1.0 billion in Tier 2.

- **Deep Panuke:** located some 65 km to the southwest of Sable Island, this project is in the planning stage, with no development plan or schedule yet approved. Several exploration and delineation wells have been drilled.

**Table 8**
**Scotian Shelf Oil and Gas Projects – Key Economic Statistics**

| | Cohasset-Panuke | Sable |
|---|---|---|
| **Development Phase** | **1990-1992** | **1998-1999** |
| **Capital cost ($millions)** | | **Tier 1** |
| Total | 500 | 2,282 |
| Nova Scotia | 184 | 712 |
| **Employment during development (PY)** | | |
| Total | 3,080 | 14,460 |
| Nova Scotia | 1,080 | 3,440 |
| **Production Phase** | **1992-1999** | **2000 on** |
| **Annual operating cost ($millions)** | | |
| Total | 110 | 133 |
| Nova Scotia | 43 | 67 |
| **Annual employment - operations (PY)** | | |
| Total | | |
| Nova Scotia | 240 | 310 |

Source: Gardner Pinfold, *Economic Impact of Offshore Oil and Gas Development in Nova Scotia, 1990-2000*, November 2002.

## Production

During the production phase, the hydrocarbons are produced at the field, processed and transported to shore facilities by pipeline or tanker. The production phase for a large field can last for several decades, although for small fields it could be much shorter (less than ten years).

- Cohasset-Panuke had a field life of just over six years, with annual operating costs in the $110 million range.
- SOEP production was originally expected to last over 25 years, but reduced recoverability could constrain this to about 15 years. Tying in other significant discoveries could extend field life. Annual operating costs are estimated at $130 million.

### Decommissioning

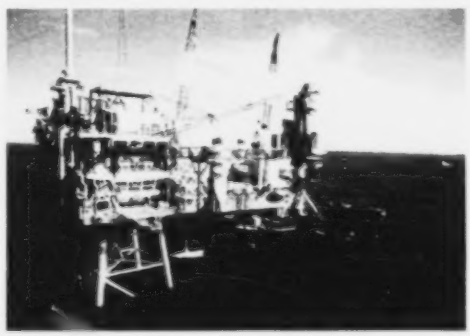
Decommissioning refers to the process of dismantling and removing structures and equipment rendered obsolete when the producing gas or oil field has exhausted its commercially productive reserves. The Cohasset oil field off Nova Scotia was decommissioned in 2000 after operating for about seven years. Costs are estimated at $50 million.

## Economic Contribution

Offshore oil and gas projects tend to be international in scope no matter where they are implemented. This is as much the case for Scotian Shelf projects as those developed in the North Sea, Gulf of Mexico or on the Grand Banks. A proportion of the spending occurs outside the national economies where the development occurs. This proportion varies depending on the capabilities and competitiveness of domestic vs. international suppliers.

- **Exploration:** Nova Scotia suppliers have been exposed to demands arising from offshore exploration for about 40 years, and content in exploration expenditures is typically in the 35% range (about $18 million per well). A supply capability consistent with the fluctuations and risks associated with the industry has developed in the province. Companies have developed the capability to meet demands for such services as marine and air support (supply vessels and helicopters), catering, technical and scientific consulting, and rig labour. The level of uncertainty is too great to support investment in rigs and other mobile offshore equipment (crane barges and pipelaying vessels).

- **Field development:** Nova Scotia suppliers had no exposure to most of the goods and services demands arising from an offshore field development prior to Cohasset-Panuke. Joint venturing allowed some deficiencies to be addressed resulting in about 37% Nova Scotia content ($184 million). This was accounted for mainly by facilities construction, marine support services and labour content in drilling. For SOEP, Nova Scotia content is estimated at 31% ($712 million), accounted for mainly by offshore and onshore facilities construction, marine and air support services, and labour content in drilling.



- **Production:** A higher proportion of annual goods and services requirements are met from local sources during production: about 40% ($43 million) in the case of Cohasset-Panuke and 50% ($67 million) for SOEP. This is accounted for largely by wages and salaries and service support (marine, air and maintenance). Offshore projects may also contribute to an economy through their returns on investment and any royalties paid to host governments.

The importance of the offshore oil and gas industry in the Nova Scotia economy increased substantially during the second half of the 1990s, with the contribution to provincial GDP rising from $78.5 million in 1995 to an estimated $1,120 million (current dollars) in 2001.[5]

Employment as measured in full-time equivalents (FTE) increased from 340 in 1995 to 2,218 in 1999 at the height of the SOEP development. It declined to the 1,140 range in 2001, attributable to SOEP production, Encana planning for Deep Panuke, and on-going exploration. These figures include those employed directly by the offshore companies as well as those employed by the major contractors and service companies whose activities are inextricable from the offshore companies themselves.

Most of the hydrocarbons produced are exported. Oil production from Cohasset-Panuke was shipped directly from the field to refineries outside the province. Most of the natural gas produced by SOEP is shipped by pipeline to the U.S. northeast. Some is sold on the Nova Scotia market (mainly for electrical generation), though much of that was exported since it proved cheaper to burn oil. Exports increased from a peak of $155 million during the life of Cohasset-Panuke (1992-1999), hitting $1.2 billion in 2001 as SOEP reached maximum production (this coincided with a sharp rise in gas prices in the U.S. due to abnormally low temperatures and supply shortages). Export value dropped to just over $800 million in 2002 as prices moderated.

The contribution of the oil and gas industry to household income increased seven-fold between 1995 and 1999, rising from $16 million during the early years of Cohasset-Panuke production to just under $180 million during SOEP development. Household income declined by about half by 2001, attributable mainly to the transition of SOEP from development to production.

The contribution made by the oil and gas sector to the Nova Scotia economy is summarized in Table 9. It is worth noting that Table 9 includes as direct industry activity many activities ordinarily classified as indirect. For example, many of the inputs needed to develop or produce a field could be carried out by the operating company or contracted out to third party contractors. If carried out by the operating company they are direct activities, if carried out by a contractor they are considered indirect (from an economic impact perspective). The distinction is somewhat artificial in the case of offshore oil and gas because operating companies tend to contract out for almost all inputs. This means that direct employment is relatively low and indirect employment is relatively high. To avoid confusion and to simplify the economic impact analysis, we treat most activities as direct since this accords with the general understanding of the nature of the input activities in question.

[5] This measure of GDP represents the income produced in the province, but only a small proportion takes the form of income flowing to residents *of* the province (those employed on the project). In the early years of a project, most of the income accrues as payments to the owners of capital residing outside Nova Scotia. While GDP is the official measure of economic contribution, in cases where there is a significant difference between income receipts and income payments, this measure will overstate the real economic contribution of an activity.

**Table 9**
**Nova Scotia Offshore Oil and Gas Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports $000s | Income (5) $000s |
|---|---|---|---|---|---|---|
| 1995 | 41,000 | 71,597 | 212 | 120,000 | 120,000 | 16,041 |
| 1996 | 43,000 | 78,505 | 241 | 155,000 | 155,000 | 18,170 |
| 1997 | 84,000 | 101,488 | 450 | 148,000 | 148,000 | 34,432 |
| 1998 | 237,000 | 155,843 | 1,177 | 95,000 | 95,000 | 93,715 |
| 1999 | 501,000 | 219,989 | 2,218 | 115,000 | 115,000 | 177,575 |
| 2000 | 562,000 | 646,506 | 1,600 | 769,000 | 769,00 | 132,506 |
| 2001 | 343,000 | 1,250,292 | 1,140 | 1,250,000 | 1,250,000 | 68,292 |

Source: Statistics Canada; Industry Canada; Gardner Pinfold, *Economic Impact of Offshore Oil and Gas Development in Nova Scotia, 1990-2000*, November 2002

Notes:
1. This captures only direct spending in Nova Scotia.
2. GDP measures income including return to and of capital. With the start of gas production at SOEP in 2000, most of the GDP impact in 2000 and 2001 arises from the revenue flow.
3. This reflects the broad definition of direct activity, capturing many inputs purchased from third party contractors (e.g., drilling rigs, supply vessels, supply base operations, fabrication).
4. Sales figures are not available. Export data are used as a proxy because most of what is sold is exported.
5. Household income data are not available from published sources. These estimates are derived from the Nova Scotia I-O Model.

# 5. PORTS AND SHIPPING

## Operations

### Ports and cargo

The marine transportation sector is a key component of the Nova Scotia economy. Its fine ports and strategic location on the main north Atlantic shipping route facilitate not only the development and growth of its natural resource base and manufacturing industry, but also the efficient movement of international cargoes to markets in central North America. A summary of port activity is shown in Table 10.

Halifax is the largest port in Nova Scotia in terms of vessel movements, with the most diverse cargo base and the most extensive hinterland. In 2001 it handled 13.9 million tonnes of cargo. It is the largest short sea shipping port in the country, the second largest cruise port in Canada after Vancouver, and the third largest container port in Canada. Other significant cargoes include gypsum, crude and refined oil as well as automobile imports and exports.

**Table 10**
**Number of Vessel Movements and Tonnage, Nova Scotia Ports – 2001**

| Port | Vessel Movements 2001 | Tonnes of Cargo 2001 (000s) | Main Cargo Types |
|---|---|---|---|
| Halifax | 1,332 | 13,943.5 | containers, vehicles, dry bulk, oil |
| Port Hawkesbury | 323 | 21,528.3 | oil, gypsum, aggregate |
| Sydney | 147 | 2,008.6 | refined oil, coal |
| Hantsport | 109 | 1,658.2 | gypsum, dry bulk |
| Shelburne | 85 | 31.4 | fish, lumber |
| Pugwash | 49 | 368.3 | salt |
| Little Narrows | 45 | 939.7 | gypsum, dry bulk |
| Liverpool | 35 | 156.7 | newsprint, break bulk |
| Weymouth | 35 | 37.5 | wood chips |
| Mulgrave | 27 | 187.3 | aggregate and wood pulp |
| Lunenburg | 25 | 0.3 | fish products |
| Pictou | 24 | 84.0 | wood pulp |
| Baddeck | 12 | - | miscellaneous |
| Sheet Harbour | 9 | 164.9 | wood fibre |
| Louisburg | 8 | - | miscellaneous |
| Yarmouth | 5 | 61.7 | fish |
| North Sydney | 4 | 80.1 | fish |
| **Total** | **2,274** | **41,398** | |

Source: Statistics Canada, *Shipping in Canada.*

Halifax faces some challenges in the future in terms of its container traffic. Terminal expansion is well underway in competing ports such as New York and Norfolk, and a major dredging project in New York will be completed in 2005 allowing the port to handle the deeper draft vessels now calling at Halifax. Nonetheless, the continued growth of cargo volumes originating in China and South East Asia, as well as port congestion on the west coast, suggests a continued role for Halifax that is vital to provincial exporters and importers.

Port Hawkesbury, on the Strait of Canso, is the largest port by tonnage of cargo handled. Most of the volume is accounted for by the petroleum transshipment facility operated by Statia Terminals. Bulk exports of gypsum, paper products, aggregate and imports of coal make up the balance. In 2001, it handled 21.5m tonnes of cargo, up by about a third from the previous few years.

Port Hawkesbury could benefit substantially from the shipment of LNG to the Strait of Canso, and Sydney could benefit from ongoing investments in coal and bulk transshipment activity. Ports such as Liverpool, Pugwash and Pictou, which are owned or controlled by their principal shipper, should prosper as long as those industries thrive.

### *Ferry industry*

Ferry service between Nova Scotia and Newfoundland, a constitutional obligation under the Terms of Union, is provided by Marine Atlantic, a federal Crown Corporation. It has seen a surge in traffic in recent years and now carries almost 500,000 passengers and 235,000 vehicles annually. Marine Atlantic employs 895 people, about one-quarter of whom reside in Nova Scotia (the rest in Newfoundland and Labrador).

Service between Nova Scotia and PEI is provided by Northumberland Ferries Ltd. Its subsidiary, Bay Ferries Ltd., also operates two services across the Bay of Fundy, from Yarmouth to Maine and from Digby to Saint John. In total, both these services carry 800,000 passengers, 265,000 vehicles and employ 310 people, about half of whom live in Nova Scotia.

The vessel used by Bay Ferries on the Saint John-Digby service is almost 35 years old and will need replacement in the next ten years. Likewise, the Scotia Prince service from Yarmouth to Portland operates with a 31 year old ship and has seen some traffic erosion in recent years as customers are switching to cruise ships sailing from New York and Boston to Maritime ports.

### *Cruise ship*

The cruise ship industry is described in Section 6, *Ocean Tourism*. Port and vessel disbursements are captured in the economic data in Table 11 below, while passenger and crew expenditures are captured in the tourism analysis in Section 6.

## *Support services*

### Marine towing

The marine towing industry takes three forms: typical harbour tug operations, tug and barge operations that involve commodities such as wood pulp, forest products and coal, as well as offshore oil and gas supply boats, which are also capable of towing offshore drilling platforms to location and doing marine salvage work. Two major tug boat companies operate in Nova Scotia, and there are at least five companies that provide offshore supply boats to the oil and gas sector.

### Ship chartering

Canada does not have a highly developed ship brokerage industry. Fairplay International lists 42 ship brokers across the country in St. John's, Halifax, Montreal, Toronto and Vancouver. It is mostly related to fixing bulk cargoes and offshore oil and gas support vessels, and projects related to offshore developments.

### Marine cargo handling

Marine cargo handling takes many forms, according to the type of cargo handled: containers, autos, forest products, liquid and dry bulk, palletized cargo. Most cargo-handling in Nova Scotia is undertaken by specialty stevedoring companies in terminals specially designed for each commodity. In the case of container terminals, they are highly capital-intensive and therefore only one port in Nova Scotia, Halifax, is engaged in this activity. Bulk-cargo terminals, such as those for grain, coal, petroleum, are also very specialized and capital-intensive. Several stevedoring and marine cargo terminal operating firms operate in Nova Scotia.

### Harbour and port operations

Port management structures vary by port. Halifax is a landlord port, where the Halifax Port Authority leases terminals or land to terminal operators and then collects rent. People working for port authorities are employed doing marketing, business development, operations, accounting, public relations and clerical functions. They do not generally get involved in actual cargo or vessel operations. Elsewhere in the province, major shippers such as Canada Salt Corporation in Pugwash or community groups, such as in Mulgrave control other ports and cargo-handling facilities.

### Pilotage

Pilots are often required to guide large vessels into rivers and ports. There are compulsory and non-compulsory pilotage areas within Canada's coastal waters. The Atlantic Pilotage Authority provides compulsory pilotage services to Halifax, Pugwash, Strait of Canso, Sydney and the Bras d' Or Lakes. It has 84 employees, including 57 pilots, and an annual budget of $14m.

### Marine shipping agencies

Shipping agents are located in port cities and towns as well as major consumer markets such as Montreal and Toronto. Boarding agents and documentation clerks will usually be located in the port, and "back office" functions can take place in either the port office or at a customer service centre away from the port. Halifax has some regional marketing activity, boarding agent activity, and back office /documentation and ship planning activity. Other ports have agency offices or ships are serviced out of Halifax.

### Other services

Other functions associated with marine activity include customs brokers, freight forwarders and NVOCCs (non-vessel owning common carriers). They can handle both ocean and air freight and sometimes specialize in either one or the other. There are several such companies in Nova Scotia, most headquartered in Halifax.

Canada also has a nascent ship management sector, mostly domiciled in Vancouver. Tax laws were changed in the 1990s to permit owners of foreign flag vessels to manage them from certain Canadian cities, including Vancouver, Montreal and Halifax. There are at least two ship management companies in Nova Scotia, one in the offshore supply boat and cable-laying business and the other operating an expedition cruise vessel in Norway and Antarctica.

## Economic Contribution

The economic contribution by the marine transportation sector arises mainly from spending by shipping lines and ferries on port services. Marine transportation generates in the range of $100-115 million annually to provincial GDP and creates between 1,500 and 1,800 full-time equivalent jobs.

**Table 11**
**Nova Scotia Ports and Shipping Industry Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports (5) $000s | Income (6) $000s |
|---|---|---|---|---|---|---|
| 1995 | 129,200 | n.a. | 1,525 | 106,900 | n.a. | 68,600 |
| 1996 | 134,100 | n.a. | 1,585 | 113,800 | n.a. | 72,900 |
| 1997 | 152,000 | 110,900 | 1,797 | 128,500 | n.a. | 84,400 |
| 1998 | n.a. | 100,000 | n.a. | n.a. | n.a. | n.a. |
| 1999 | 142,100 | 116,500 | 1,679 | 117,100 | n.a. | 82,270 |
| 2000 | 138,600 | 104,100 | 1,644 | 112,900 | n.a. | 82,200 |
| 2001 | 144,900 | 101,200 | 1,719 | 116,000 | n.a. | 85,950 |

Source: Statistics Canada; Gardner Pinfold, *Port of Halifax Economic Impact Study, 2000.*

Notes:
1. Spending exceeds port services sales revenues because it includes crew spending.
2. GDP estimate is from Statistics Canada.
3. Employment is for port activities: vessel services and cargo handling. It excludes rail and truck transport (indirect activities).
4. Sales figures are payments made for port services and exclude shipping revenues.
5. Export data for port and shipping services are not compiled by Statistics Canada.
6. Household income data are not available from published sources. The estimates here are derived using an average of $45,000 per FTE in 1995, rising to $50,000 by 2000.

n.a. not available

# 6. OCEAN TOURISM

## Operations

The Nova Scotia Department of Tourism, Culture and Heritage estimates that tourism in the province generates expenditures in the $1.3 billion range. How much of this may be assigned with confidence to ocean-related tourism is not clear due to data limitations.

In this study, ocean tourism is broken down into three expenditure-driven areas: cruise ship activity, coastal tourism in the form of water-based recreational activities, and marine recreational fishing. While tourists in Nova Scotia take part in other ocean activities, these three are well defined and at least some attempt has been made to quantify their economic significance. But data quality varies. If a comprehensive measure of the economic contribution made by ocean tourist activities is desired, then more resources must be devoted to gathering basic statistics.

### Cruise ships

The two major ports of call for cruise ships in Nova Scotia are Halifax and Sydney. The number of vessels making calls at Halifax and Sydney has been increasing steadily, with passenger counts since 2000 topping 150,000 in Halifax, and exceeding 50,000 in Sydney in 2002. These numbers do not take into account the crews, which also contribute marginally to the economic impact of cruise ship tourism.

**Table 12**
**Cruise Ships and Passengers in Halifax and Sydney**

| | Number of Ships | | Number of Passengers | |
|---|---|---|---|---|
| Year | Halifax | Sydney | Halifax | Sydney |
| 1995 | 39 | n.a. | 30,257 | n.a |
| 1996 | 46 | n.a | 36,584 | n.a |
| 1997 | 46 | n.a | 44,328 | 14,411 |
| 1998 | 53 | n.a | 47,798 | 24,447 |
| 1999 | 73 | 26 | 107,837 | 19,901 |
| 2000 | 94 | 23 | 138,371 | 23,970 |
| 2001 | 96 | 42 | 160,237 | 39,927 |
| 2002 | 87 | 40 | 157,036 | 54,734 |

Source: Halifax Port Authority; Nova Scotia Department of Tourism, Culture and Heritage

Halifax has benefited from the trend towards 4-5 day cruises and most of its growth has come from this segment, with operators such as Carnival Cruise Lines, Princess Cruises and Royal Caribbean International offering this type of product. In 2003, Carnival's 20 ship calls accounted for 63,483 passengers or 36% of the total. Royal Caribbean's three vessels accounted for another 41,495 passengers on similar itineraries.

Growth has also come from the introduction of larger vessels, mostly in the same 4-5 day market, but also on the New York-Montreal or Boston-Quebec City itinerary. Vessels such as *Carnival Victory*, *Voyageur of the Seas*, *Grand Princess* and *Queen Mary 2* all exceed 100,000 GRT and with the exception of the *QM2*, carry more than 3,000 passengers.

Typically, vessels call at each port for a day, allowing passengers to disembark and tour the local area. Impacts from cruise ships include expenditures outside the "cruise package", such as local packaged tours purchased ashore, expenditures in restaurants and bars, walking tours, rickshaw rides, shopping and museum visits, and attending local events.

### Marine recreational fishery

The 1995 and 2000 Survey of Recreational Fishing in Canada (DFO) Study shows the following for saltwater fishing in Nova Scotia:

**Table 13**
**Saltwater Fishing in Nova Scotia, 1995 and 2000**

| | 1995 | | | 2000 | | |
|---|---|---|---|---|---|---|
| | Number of Days | Average days per Angler | Average Spending per Angler | Number of Days | Average days per Angler | Average Spending per Angler |
| Resident | 198,789 | 11 | $553.33 | 254,706 | 11.2 | $532.79 |
| Nonresident Canadian | 688 | 4 | $665.51 | 769 | 4.3 | $794.28 |
| Nonresident Non-Canadian | 741 | 4 | $875.42 | 604 | 2.6 | $1,072.31 |
| **Total** | **200,217** | **11** | **$557.61** | **256,079** | **11.1** | **$540.22** |

Source: DFO, Survey of Recreational Fishing (1995, 2000)
Note: Overall average spending is weighted by number of days.

The surveys revealed that there were approximately 18,000 saltwater anglers in Nova Scotia in 1995, and nearly 23,000 in 2000. In 1995, marine fishing effort constituted about 17% of total recreational fishing effort (days) in the province, while in 2000, the share rose to over 22%. In 2000, anglers spent approximately $660/year each on fishing (Canadian average), bringing the approximate total spending by saltwater anglers in Nova Scotia to just over $12.5 million, up from $10.3 million in 1995. Spending on saltwater fishing is typically on boats, motors, vehicles and transportation, and camping and fishing equipment.

### Coastal tourism

Coastal tourism captures a wide array of activities including ocean touring (whale watching, sightseeing, diving, kayaking), as well as sailing, cruising and visiting beaches and other marine locations.

Regrettably, statistical agencies and departments of tourism in Canada do not systematically track demand for these activities. Consequently, reliable statistical information about coastal tourism is minimal. The two potential sources yield results of limited value due to a lack of specific focus on ocean activities:

- An exit survey conducted every four years by the Department of Tourism, Culture and Heritage ("Department of Tourism") provides some general information about the significance of the ocean in drawing visitors to the province. But documenting the nature and level of participation in ocean activities is not its main purpose, and so it provides inadequate detail for estimating economic impacts associated with any particular activities.

- The Canadian Travel Survey (CTS) is conducted annually as part of the Labour Force Survey. It is a general survey tracking tourism activities of Canadians by province. The survey results for Nova Scotia residents provide no basis whatsoever for estimating the impact of participation in ocean activities because the survey instrument contains no ocean-specific questions.

The lack of reliable coastal tourism data creates a clear gap in the measurement of the ocean economy. With the tourism industry as a whole in Nova Scotia generating expenditures estimated at over $1.0 billion annually, the impact arising from ocean activities could run to the hundreds of millions of dollars.

We recommend strongly that the Department of Tourism address the information gap surrounding the significance of the ocean as a basis of tourism activity. Given the limitations of the existing data sources, we suggest two initiatives: first, for out-of-province visitors, modify the exit survey to include questions that more accurately capture the role of the ocean in attracting visitors and that allow actual expenditures on ocean activities to be estimated; and second, conduct a survey of Nova Scotia residents every 3-4 years aimed at capturing the role and impact of the ocean in tourism activity and spending decisions.

## Economic Contribution

Combining expenditures by cruise ship passengers and crew with total spending by recreational saltwater anglers, we are able to provide at least a minimum estimate of the economic contribution of ocean tourism. Missing is information about the contribution of coastal tourism activities such as whale watching, bird watching, ocean tours, diving, kayaking, sailing and cruising.

**Table 14**
**Nova Scotia Ocean Tourism Economic Data**

| | Expenditures | | GDP (1) | Employment (2) | Income (3) |
|---|---|---|---|---|---|
| | $000s | $000s | $000s | FTE | $000s |
| | Cruise | Fishing | | | |
| 1995 | n.a. | 10,275 | n.a. | n.a. | n.a. |
| 1996 | n.a. | 10,720 | n.a. | n.a. | n.a. |
| 1997 | 7,975 | 11,165 | 8,700 | 300 | 5,650 |
| 1998 | 9,332 | 11,610 | 9,520 | 328 | 6,183 |
| 1999 | 17,510 | 12,055 | 13,440 | 463 | 8,728 |
| 2000 | 21,490 | 12,500 | 15,450 | 533 | 10,035 |
| 2001 | 25,695 | 12,950 | 17,567 | 606 | 11,410 |

Source: Statistics Canada, *The Provincial and Territorial Tourism Satellite Accounts for Canada, 1998.*

Notes:
1. Estimated by applying the ratio of tourism industry GDP to total tourism industry expenditures (all sectors) to total ocean tourism expenditures.
2. Estimated by applying GDP per job data for the total tourism industry to ocean industry tourism GDP.
3. Derived by multiplying FTE by average tourism wage and salary (rises from $18,000 to $19,000 by 2001).

# 7. SHIPBUILDING AND REPAIR AND BOATBUILDING

## Operations

Shipbuilding and repair and boatbuilding are distinct sectors for purposes of industrial classification, with the distinction based on vessel size. They are described separately here, but data restrictions due to the small number of shipyards prevent a distinct presentation of economic information.

### Shipbuilding and repair

Up to the 1960s and even into the 1970s, the shipbuilding industry in Nova Scotia represented a significant force in several coastal communities including Halifax, Dartmouth, Pictou, Lunenburg, North Sydney and Shelburne. But the combination of declining demand and reduced competitiveness has resulted in a dramatic drop in industry capacity. With the closure of yards elsewhere in the province, only Halifax has the capability of actually building ships.

Halifax Shipyards has been building and repairing commercial and naval vessels for over 110 years. The yard started in the late 1880s with a graving dock blasted out of rock, serving mainly the Royal Navy. That dock is still in use, but the yard relies mainly on its two floating dry docks for ship refit, repair and conversion. Halifax Shipyards entered the offshore construction industry in the 1970s, building several semi-submersible rigs and a drill ship.

The 1980s were lean years for shipbuilding generally, and in 1994 the yard was taken over by new owners. They invested heavily in the yard, constructing buildings, modernizing equipment, upgrading facilities and introducing new systems. The yard participated in the Maritime Coastal Defence Vessel (MCDV) Program, completing the HMCS Kingston in 1995 and the HMCS Summerside in 1999. Since then, four offshore supply vessels have been built at the yard.

Halifax Shipyards currently employs 500-700 workers, focusing mainly on ship repair and refit. Major clients include the navy, coast guard and commercial cargo vessels. Levels of subsidization in Far East and European yards make it very difficult for Canadian shipyards to compete in the new construction market. Most Canadian yards have closed (Saint John Shipyard closed in 2003 after years of idleness). The refit market is expected to remain steady. Any real growth would be contingent on an expansion of offshore development activity *and* the ability of the yard to secure contracts.

A second fabrication facility operates in Halifax Harbour at the Woodside wharf. Under a succession of operators, this facility has been used to fabricate structures for the offshore industry since 1990. Continuous upgrades at Woodside have resulted in an ideal facility for constructing small to medium size modules and structures for the offshore. The episodic nature of the offshore industry is the major challenge facing the yard. The turnover in operators attests to this. The workforce has fluctuated widely over the past three years, peaking at about 1,700 during a major drilling rig refit and down to about 150 in early 2004 with construction of facilities for SOEP

### Boatbuilding

The boatbuilding sector consists of some 35 yards, at various locations along the coast, but concentrated in southwest Nova Scotia. Another 45 or so firms provide support services. The sector serves mainly the fishing industry, but in recent years has diversified into pleasure craft (both sail and motorized). These yards and support services form an important element in the economies of coastal communities.

In 2001, the boatbuilding sector generated annual sales in the $80 million range, with about $35 million in export sales (including sales to the rest of Canada). It generates 800 to 900 direct jobs. With provincial and federal support, its umbrella organization (the Nova Scotia Boatbuilders Association) has implemented various development and marketing initiatives, and as a result, the sector seems poised for further growth.

## Economic Contribution

Both shipbuilding and boatbuilding faced challenging market conditions in the late 1980s and early 1990s. Declining domestic demand coupled with highly subsidized international competition caused several yards in Canada to close. Nova Scotia's one remaining shipyard survives on refits and repair. A downturn in the fishing industry caused similar hardship in the boatbuilding sector, though this began to turnaround in the late 1990s as the shellfish fisheries expanded injecting substantial income into the industry. Much of the income was reinvested in new fishing vessels.

The data in Table 15 reflects industry stability up to 2001. The jump in activity in 2002 is due primarily to demand from the offshore, mainly the refit of the drill rig Eirie Raude in Halifax. Regrettably, sector data for the early 1990s are not available. The data indicate gradual improvement in the boatbuilding sector, with GDP climbing from $8 to 11 million.

**Table 15**
**Nova Scotia Shipbuilding, Boatbuilding and Repair Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | | Employment FTE | Sales $000s | Exports (3) $000s | Income (4) $000s |
|---|---|---|---|---|---|---|---|
| | | Ship | Boat | | | | |
| 1995 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1996 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1997 | n.a. | n.a. | 8,300 | n.a. | n.a. | n.a. | n.a. |
| 1998 | 101,000 | 65,537 | 7,282 | 1,040 | 133,630 | 5,500 | 41,600 |
| 1999 | n.a. | n.a. | 10,700 | n.a. | n.a. | 5,700 | n.a. |
| 2000 | 94,600 | 59,415 | 6,600 | 940 | 118,007 | 8,260 | 37,600 |
| 2001 | 96,200 | 75,540 | 8,390 | 1,200 | 128,508 | 9,540 | 48,000 |
| 2002 | 342,200 | 156,600 | 11,100 | 2,400 | 385,917 | 7,250 | 143,700 |

Source: Statistics Canada; Industry Canada

Notes:
1. Captures cost of materials and supplies, fuel and electricity and wages and salaries.
2. Only GDP data are available separately for the ship and boat building sectors
3. Includes only exports from Canada. Excludes exports from Nova Scotia to the rest of Canada.
4. Household income estimated by multiplying FTE by average income of $40,000. Income increased to $60,000 in 2002 to reflect payments for offshore refit work.

# 8. MARINE MANUFACTURING AND SERVICES

## Operations

The ocean manufacturing and services sector in Nova Scotia consists of firms producing goods and services in the following areas:

- Marine technologies and equipment, subsea vehicles, navigation, ocean sensors and imaging, and information systems used in ocean operations;
- Communication and electronics for navigation;
- Professional services in the electronic and environmental engineering sectors, marine and vessel engineering, oceanography, meteorology, and ocean surveying and mapping;
- Environmental impact and coastal management;
- Products aiding search and rescue in the military, fishing and oil and gas sectors.

This sector is driven by six main sources of demand: defence and security, offshore oil and gas, fisheries, aquaculture, fish processing, and marine transportation. Research and development take place both in private and public laboratories and institutes, and is supported by a number of public-private partnerships, programmes, innovation foundations, and federal agencies.

This sector is relatively small and specialized, and is not well represented in official statistics. This is because it does not conform to a single industrial classification, but cuts across several. Consequently quantifying its economic characteristics is difficult. The closest proxy, and the one we rely on in this analysis is NAICS 33451 "Navigation instruments manufacturing". These firms produce transmitters, acoustic transducers, marker buoys, sonobuoys, electronic systems for underwater telemetry, and underwater data acquisition, signaling and communications equipment.

In the late 1990s, there were at least nine firms in this sector employing over 450[6] people. By 2003, the number of firms had increased to 13, with employment of about 590[7]. Most employ fewer than 20, with two employing between 150 and 200.

A recent Industry Canada report suggests that Nova Scotia is home to 13% of ocean technology firms in Canada, or about 65 firms. The difficulty in attributing these firms to the "Oceans Sector" lies in the specific uses of the end products, and whether or not they are inherently "ocean specific" devices and products, or whether they can and are used in other, non-ocean related applications. Also, engineering and design firms (which may have some ocean related specialty, but not be strictly oceans-sector) help to boost this number. Other than the number of firms, no information about this group is available.

## Economic Contribution

The limited data available for this sector indicate growth during the late 1990s, with GDP doubling from $18.4 to $36.6 million. Judging from the relationship between GDP and exports, the sector clearly has a strong export orientation. This is borne out through interviews with industry observers.

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[6] Nova Scotia Directory of Manufacturers, 1998-99. Province of Nova Scotia

[7] "Canadian Company Capabilities", Industry Canada. (Website updated 2003-07-26)

**Table 16**
**Nova Scotia Ocean Manufacturing and Services Economic Data**

| | Expenditures $000s | GDP $000s | Employment (1) FTE | Sales $000s | Exports $000s | Income $000s |
|---|---|---|---|---|---|---|
| 1995 | n.a. | n.a. | 450 | n.a. | 24,921 | n.a. |
| 1996 | n.a. | n.a. | 450 | n.a. | 22,510 | n.a. |
| 1997 | n.a. | 18,400 | 450 | n.a. | 20,053 | n.a. |
| 1998 | n.a. | 33,400 | 475 | 77.4 | 38,551 | 13,000 |
| 1999 | n.a. | 36,600 | 500 | n.a. | 55,594 | n.a. |
| 2000 | n.a. | n.a. | 525 | n.a. | 55,413 | n.a. |
| 2001 | n.a. | n.a. | 550 | n.a. | 69,127 | n.a. |

Source: Statistics Canada; Industry Canada; Nova Scotia Directory of Manufacturers.
Notes: 1. Estimated based on Nova Scotia Directory of Manufacturers, 1998-1999.

# 9. MARINE CONSTRUCTION

## Operations

This sector captures the building and maintenance of fixed installations to facilitate marine transportation and related activities. Such installations include wharves, jetties, piers and loading facilities to serve commercial shipping, ferry service, fishing and aquaculture, military requirements and recreational boating. It would ordinarily include such facilities built for the offshore oil and gas industry (e.g., pipelines and docks), but these are captured as part of Offshore Oil & Gas activity. Other facilities such as offshore platforms are considered manufacturing since they are moved from the point of fabrication to the place of use.

Marine construction during the study period is dominated by facilities to support the fishing industry and Canadian navy. DFO supported the construction and maintenance of wharves and facilities under its small craft harbours program (though most of these facilities are being or have been divested to community groups). DND upgraded various facilities, with the bulk of expenditures directed at the Dockyard in Halifax (an on-going program) to accommodate new vessels and replace aging structures. Annual expenditures are set out in Table 17

**Table 17**
**Nova Scotia Marine Construction Expenditures ($000s)**

| | Fisheries and Oceans | National Defence | Total |
|---|---|---|---|
| 1996 | 3,330 | n.a. | n.a. |
| 1997 | 18,840 | n.a. | n.a. |
| 1998 | 16,270 | n.a. | n.a. |
| 1999 | 20,920 | 3,630 | 24,550 |
| 2000 | 34,555 | 6,975 | 41,530 |
| 2001 | 27,655 | 4,015 | 28,670 |
| 2002 | 23,010 | 4,305 | 27,315 |
| 2003 | 30,605 | 4,175 | 34,780 |

Source: Department of Fisheries and Oceans, Department of National Defence.

Not included in Table 17 is any marine construction carried out by private interests. Marine construction data are not reported separately by Statistics Canada, but are included in a general non-residential construction category. No major projects were identified during the study period through interviews with port authorities and regulatory agencies. Some smaller projects may have been implemented. Accordingly, the marine construction estimates are likely to be conservative.

## Economic Contribution

The economic contribution by marine construction is through wages and salaries, purchase of local materials and sub-contracting services, and equipment leasing. In the absence of marine-specific construction cost data, non-residential construction factors are used to estimate the key economic indicators in Table 18.

**Table 18**
**Nova Scotia Marine Construction Economic Data**

| | Expenditures (1) $000s | GDP (2) $000s | Employment (3) FTE | Sales (4) $000s | Exports (5) $000s | Income (6) $000s |
|---|---|---|---|---|---|---|
| 1995 | 43,142 | 21,571 | 604 | 43,142 | | 15,100 |
| 1996 | 41,977 | 20,988 | 588 | 41,977 | | 14,692 |
| 1997 | 48,798 | 24,399 | 683 | 48,798 | | 17,079 |
| 1998 | 49,477 | 24,739 | 693 | 49,477 | | 17,317 |
| 1999 | 55,364 | 27,682 | 775 | 55,364 | | 19,377 |
| 2000 | 49,704 | 24,852 | 696 | 49,704 | | 17,396 |
| 2001 | 63,288 | 31,644 | 886 | 63,288 | | 22,151 |
| 2002 | 50,722 | 25,361 | 710 | 50,722 | | 17,753 |

Source: Statistics Canada; Table 17, above.

Notes:
1. The sum of DFO and DND marine construction expenditures.
2. Based on the relationship of spending and GDP from non-residential construction.
3. FTEs. Assumes labour is 35% of expenditures, with average wages of $25,000/year.
4. Sales represent the value of construction.
5. All construction is Nova Scotia based.
6. Based on $25,000 per FTE.

# 10. GOVERNMENT SERVICES

## Activity

Federal and provincial government departments and agencies contribute to the value of the oceans sector in Nova Scotia in a number of ways: direct employment, capital spending, operations and maintenance spending, spending on research and development, and in the support of initiatives in the non-profit and not-for-profit sectors. This section describes the employment and spending patterns of the key federal and provincial government departments and agencies. Table 19 shows that two departments in particular, the federal Department of National Defence (DND) and the Department of Fisheries and Oceans (DFO) are the major players in the Nova Scotia oceans sector.

**Table 19**
**Government Services Ocean Sector Employment and Expenditures, 2001**

| | | Expenditures (000s) | |
|---|---|---|---|
| | **FTE** | **Salaries** | **All Other Expenditures** |
| **Federal Departments** | | | |
| National Defence | 10,840 | 571,725 | 206,815 |
| Fisheries and Oceans | 1,920 | 103,478 | 139,282 |
| Transport Canada | 77 | 5,079 | 1,587 |
| Environment Canada | 10 | 711 | 402 |
| Ocean research | 145 | 9,450 | 11,550 |
| **Provincial Departments** | | | |
| Agriculture and Fisheries | 114 | 5,687 | 3,433 |
| CNSOPB | 34 | 2,564 | 1,524 |
| Energy | 23 | 1,200 | 600 |
| Tourism and Culture | n.a. | n.a. | n.a. |
| **Total** | **13,164** | **699,894** | **353,642** |

Source: Federal and provincial departments.

## Federal Departments

### Department of National Defence

CFB Halifax is Canada's largest military base and home to Canada's Atlantic naval establishment. It incorporates three main facilities. HMC Dockyard in HRM is base for the fleet of frigates, supply vessels, submarines and coastal defence vessels, operating with about 7,000 military and civilian personnel. 12 Wing Shearwater is home to the navy diving school and Sea King helicopter base. About 1,000 personnel are employed here. It also provides a jetty for docking NATO submarines. The base is to become headquarters for the Maritime Helicopter Program, the replacement for the Sea King. CFB Stadacona contains management, training and accommodation facilities. New buildings are planned as facilities and functions are consolidated.

DND's contribution to ocean activity also includes operations at 14 Wing Greenwood, the base for the Aurora long-range surveillance aircraft patrolling Canada's extensive Atlantic coast.

Employment has remained fairly stable since budget cuts in the mid-1990s. DND's oceans activities account for about 12,000 FTEs and $750 million annually in expenditures in Nova Scotia (Table 20). These figures exclude land forces (army) personnel and expenditures.

**Table 20**
**Department of National Defence Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 957,809 | 666,448 | 13,829 | 255,696 | 35,665 |
| 1996 | 752,223 | 518,346 | 12,966 | 199,135 | 34,742 |
| 1997 | 739,547 | 495,884 | 12,141 | 198,340 | 45,323 |
| 1998 | 772,091 | 515,238 | 11,891 | 207,878 | 48,975 |
| 1999 | 785,609 | 545,684 | 11,108 | 191,388 | 48,538 |
| 2000 | 772,080 | 558,281 | 10,917 | 193,805 | 19,994 |
| 2001 | 778,540 | 571,725 | 10,840 | 184,925 | 21,890 |
| 2002 | 786,854 | 583,434 | 10,687 | 186,161 | 17,259 |
| 2003 | 760,186 | 565,523 | 10,840 | 194,663 | n.a. |

Source: Department of National Defence

### *Department of Fisheries and Oceans*

The Department of Fisheries and Oceans is the second largest government department employer in the Nova Scotia economy, with over 1,900 full-time-equivalent jobs in 2001. The Department is the lead federal government department responsible for developing and implementing policies and programs in support of Canada's economic, ecological and scientific interests in oceans and inland waters. The mandate includes responsibility for the conservation and sustainable use of Canada's fisheries resources. The Coast Guard (fully part of DFO over the study period) provides search and rescue, icebreaking, navigational and marine communications and traffic services.

**Table 21**
**Department of Fisheries and Oceans Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 249,590 | 144,796 | 3,321 | 95,365 | n.a. |
| 1996 | 220,436 | 110,648 | 2,460 | 97,935 | n.a. |
| 1997 | 197,906 | 110,348 | 2,378 | 64,486 | 23,072 |
| 1998 | 187,769 | 92,443 | 1,930 | 61,452 | 33,874 |
| 1999 | 192,058 | 91,238 | 1,845 | 54,651 | 46,169 |
| 2000 | 252,838 | 97,862 | 1,915 | 62,962 | 92,014 |
| 2001 | 242,760 | 103,478 | 1,920 | 68,880 | 70,402 |
| 2002 | 240,025 | 108,806 | 1,915 | 73,795 | 57,424 |
| 2003 | 216,550 | 108,352 | 1,827 | 56,291 | 51,907 |

Source: Department of Fisheries and Oceans

### Transport Canada

Transport Canada's mission is "to develop and administer policies, regulations and services for the best transportation system for Canada and Canadians." The expenditures in Table 22 are those for salaries and for the Marine Safety program (inspecting ships, examining construction documents, ancillary policy such as source pollution from vessels, and activities related to offshore drilling) and for Ports Maintenance. Transport Canada has divested itself of most ports in Nova Scotia, but has retained some for their commercial value. Also included are figures for travel and supplies by Transport Canada employees.

**Table 22**
**Transport Canada Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 5,910 | 4,036 | 74 | 1,874 | n.a. |
| 1996 | 5,910 | 4,036 | 74 | 1,874 | n.a. |
| 1997 | 5,910 | 4,036 | 74 | 1,874 | n.a. |
| 1998 | 5,910 | 4,036 | 74 | 1,874 | n.a. |
| 1999 | 5,967 | 4,422 | 75 | 1,545 | n.a. |
| 2000 | 5,778 | 4,461 | 75 | 1,317 | n.a. |
| 2001 | 6,666 | 5,079 | 77 | 1,587 | n.a. |
| 2002 | 6,456 | 5,146 | 78 | 1,310 | n.a. |
| 2003 | 6,091 | 5,110 | 78 | 981 | n.a. |

Source: Transport Canada

### Environment Canada

Environment Canada's Atlantic headquarters is in Nova Scotia. The agency has a broad mandate for environmental conservation and protection on Canadian lands including the oceans. Specific ocean responsibilities in Nova Scotia include monitoring and enforcement of marine legislation pertaining to wildlife, migratory birds, biological diversity, environmental protection, fisheries (including shellfish) and shipping. Specific responsibilities include Ocean Dumping, the Atlantic Coastal Action Program, marine forecasting, Birds Oiled at Sea (BOAS) and Maritime Marine Eco-system Research projects.

**Table 23**
**Environment Canada Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 1,090 | 696 | 10 | 395 | n.a. |
| 1996 | 1,090 | 696 | 10 | 395 | n.a. |
| 1997 | 1,090 | 696 | 10 | 395 | n.a. |
| 1998 | 1,090 | 696 | 10 | 395 | n.a. |
| 1999 | 1,090 | 696 | 10 | 395 | n.a. |
| 2000 | 1,155 | 726 | 10 | 429 | n.a. |
| 2001 | 1,113 | 711 | 10 | 401 | n.a. |
| 2002 | 1,142 | 711 | 10 | 431 | n.a. |
| 2003 | 1,086 | 691 | 10 | 395 | n.a. |

Source: Environment Canada

### Parks Canada

The Parks Canada mandate is to provide support services for National Parks in Atlantic Canada. Regional headquarters are in Nova Scotia. The major focus of Parks Canada is terrestrial. A small number of employees are tasked with operations and maintenance at ocean-side parks, roadside interpretive exhibits and beaches. These include the Cape Breton Highlands National Park, the Fortress of Louisburg, and the Kejimkujik National Park Seaside Adjunct.

### Atlantic Canada Opportunities Agency

The Atlantic Canada Opportunities Agency undertakes a variety of policy, advocacy and co-ordination activities with respect to economic development in the region. The agency partners with small and medium-sized enterprises to enhance capacity and foster growth and development in Atlantic Canada. ACOA also partners with aboriginal communities, research institutes, provincial governments, municipalities, community-based economic organizations, and other federal government agencies. Some of these activities have an ocean focus, but overall funding for oceans activities is relatively small. Over the 1995-2003 period, ACOA provided grants and contributions totalling about $15 million. Most of these funds are captured as revenue by organizations, and reflected in the economic data. Among the organizations are: Nova Scotia Boatbuilders Association, Aquaculture Association of Nova Scotia and Petroleum Research Atlantic Canada.

### Ocean research

#### Operations

Ocean research is driven by the need for a better understanding of the marine environment in all its dimensions (physical, chemical, biological and geological), and also by the desire to ensure sustainable use of ocean resources. Nova Scotia is home to four major publicly funded research organizations with a specific ocean research focus:

- **Bedford Institute of Oceanography** (BIO) – in its own words, BIO performs targeted research, mandated by the Canadian government, to provide advice and support to government decision making on a broad range of ocean issues, including sovereignty, defence, environmental protection, health and safety, fisheries and natural resources and undertakes environmental and oceans management and planning. BIO is home to some 500 scientists, engineers, technicians and natural resource managers and support staff from four federal departments: Fisheries and Oceans, Environment, Natural Resources and Defence. BIO's annual expenditures are included in the DFO figures in Table 21.

- **Institute for Marine Biosciences** (IMB-NRC) – one of the NRC's 20 research institutes, the IMB is located in Halifax adjacent to Dalhousie University. IMB is an integrated systems biology institute targeting three core areas: aquaculture, natural marine toxins and advanced research technologies. IMB is home to some 120-150 scientists, technicians and support staff. The budget has been rising steadily, and in 2003 the IMB operated with a $20 million budget (Table 24).

- **Dalhousie University Department of Oceanography** (DU) – is one of Canada's leading oceanography departments, with some 20 full-time faculty and an annual operating budget of $1.5 million. The department has seen its research success climb in recent years, attracting over $6 million annually in research grants and contracts, up from about $2.6 million in 1997.

**Defence Research and Development Canada - Atlantic** (DRDC) – DRDC is a research centre of Defence R&D Canada, a Special Operating Agency of DND. DRDC conducts research and development in underwater sensing and countermeasures, Naval Command & Control Information Systems, naval platforms, air platforms, signature management, emerging materials, and modelling and simulation. Its main facilities in Nova Scotia are in Dartmouth, with materials research laboratories in CFB Halifax. DRDC's R&D program is supported by a staff of 240 and a budget of $28 million, $13 million of which is used to fund research contracts or goods and services with external suppliers. Annual expenditures are included in the DND figures in Table 20.

Ocean research activity by the private sector is not documented in published sources and no reliable basis exists upon which to estimate the level of expenditures and trends in activity. With few large firms active in ocean technology (development and manufacturing), the level of research is believed to be relatively small compared with that which is publicly funded.

**Table 24**
**Nova Scotia Ocean Research Expenditures**
**($000s)**

| | BIO | IMB | DU | DRDC | Total |
|---|---|---|---|---|---|
| 1996 | n.a. | 8,560 | 3,300 | n.a. | |
| 1997 | n.a. | 7,775 | 4,100 | n.a. | |
| 1998 | n.a. | 8,710 | 4,400 | n.a. | |
| 1999 | n.a. | 12,395 | 5,200 | n.a. | |
| 2000 | n.a. | 16,230 | 6,100 | n.a. | |
| 2001 | n.a. | 14,660 | 6,700 | n.a. | |
| 2002 | n.a. | 14,450 | 7,300 | n.a. | |
| 2003 | n.a. | 20,180 | 7,600 | 28,000 | |

Source: DFO, IMB-NRC and Dalhousie University

## Economic Contribution

The short-term economic contribution of ocean research is mainly through wages and salaries, but also includes operation and maintenance of research facilities (including vessels). These expenditures are summarized in Table 24. Over the longer term, of course, research results contribute to economic development and growth, but in this study we are interested in measuring the more immediate economic impact of ocean activities. The data in Table 24 include only IMB-NRC and Dalhousie University (with BIO and DRDC in the years for which data are available). A complete picture of the overall scale of ocean R&D is possible only if all departments and agencies can make this specific information available.

**Table 25**
**Nova Scotia Ocean Research Economic Data**

| | Expenditures (1) ($000s) | GDP (2) ($000s) | Employment (3) FTE | Sales (4) ($000s) | Exports (5) ($000s) | Income (6) ($000s) |
|---|---|---|---|---|---|---|
| 1995 | 10,000 | 4,500 | 90 | | | 4,500 |
| 1996 | 11,500 | 5,175 | 100 | | | 5,175 |
| 1997 | 11,000 | 4,950 | 92 | | | 4,950 |
| 1998 | 12,500 | 5,625 | 100 | | | 5,625 |
| 1999 | 17,000 | 7,650 | 132 | | | 7,650 |
| 2000 | 21,000 | 9,450 | 158 | | | 9,450 |
| 2001 | 21,000 | 9,450 | 145 | | | 9,450 |
| 2002 | 22,000 | 9,900 | 146 | | | 9,900 |

Source: IMB-NRC and Dalhousie University (DU).

Notes:
1. The sum of the IMB and DU Oceanography budgets.
2. Based on salaries.
3. Actual FTEs for the institutions (scientists, faculty and support staff).
4. Not applicable
5. Not applicable.
6. Actual salary and wage data.

## Provincial Departments

### Nova Scotia Department of Agriculture and Fisheries (NSDAF)

The oceans component of NSDAF has responsibility for the ongoing support of Nova Scotia's fishing industry (which includes inland sport fishing), including advocacy, regulations and enforcement, resource development and protection, and technology and market development. Expenditures are related to policy and planning, legislation and compliance, industrial development, and the Fisheries Loan Board. Prior to 2001, the fisheries component of NSDAF had its own department (Fisheries and Aquaculture) with an exclusive ocean focus.

**Table 26**
**NS Department of Agriculture and Fisheries Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 9,795 | 4,526 | 107 | 2,824 | n.a. |
| 1996 | 7,472 | 4,438 | 98 | 2,554 | n.a. |
| 1997 | 7,471 | 4,454 | 100 | 2,588 | n.a. |
| 1998 | 7,719 | 4,717 | 97 | 3,002 | n.a. |
| 1999 | 10,342 | 4,819 | 92 | 2,449 | n.a. |
| 2000 | 7,843 | 4,885 | 96 | 2,442 | n.a. |
| 2001 | 9,119 | 5,687 | 114 | 2,070 | n.a. |
| 2002 | 11,045 | 6,456 | 122 | 3,175 | n.a. |
| 2003 | 10,356 | 6,483 | 122 | 2,688 | n.a. |

Source: NS Department of Agriculture and Fisheries

### Canada-Nova Scotia Offshore Petroleum Board

The Canada-Nova Scotia Offshore Petroleum Board is an independent board managing petroleum resources and activities in the offshore. It is a combined effort by the provincial and federal governments, formed in 1990. The Board concerns itself with health and safety in the offshore, protection of the environment, resource conservation, and ensuring proper benefits to workers and to Nova Scotia. Since its inception, employment at the Board has grown from 14 to 34 persons, with a growing annual budget that now exceeds $4.0 million.

**Table 27**
**CNSOPB Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | 1,427 | 982 | 15 | 445 | n.a. |
| 1996 | 1,546 | 953 | 15 | 593 | n.a. |
| 1997 | 1,715 | 1,127 | 18 | 588 | n.a. |
| 1998 | 2,145 | 1,469 | 23 | 676 | n.a. |
| 1999 | 2,607 | 1,802 | 29 | 805 | n.a. |
| 2000 | 2,934 | 2,016 | 32 | 918 | n.a. |
| 2001 | 4,088 | 2,564 | 34 | 1,524 | n.a. |
| 2002 | 4,445 | 2,880 | 34 | 1,565 | n.a. |
| 2003 | 4,452 | 3,113 | 34 | 1,339 | n.a. |

Source: CNSOPB

### Nova Scotia Department of Energy

The Nova Scotia Department of Energy, officially formed in 2003, is the lead agency for policy formulation in the offshore energy sector as it applies to Nova Scotia. The department is a consolidation of the Nova Scotia Petroleum Directorate and the energy-related activities of the Nova Scotia Department of Natural Resources. Its mission is to ensure responsible resource management of Nova Scotia's energy resources, maximizing financial, economic, industrial and employment benefits flowing from the development and use of the province's energy resources.

**Table 28**
**NS Department of Energy Ocean Expenditures and Employment**

| | Total Spending $000s | Wages and Salaries $000s | Employment FTE | O&M $000s | Capital $000s |
|---|---|---|---|---|---|
| 1995 | n.a. | 965 | 23 | 485 | n.a. |
| 1996 | n.a. | 1,035 | 23 | 520 | n.a. |
| 1997 | n.a. | 1,035 | 23 | 520 | n.a. |
| 1998 | n.a. | 1,125 | 23 | 565 | n.a. |
| 1999 | n.a. | 1,200 | 23 | 600 | n.a. |
| 2000 | n.a. | 1,200 | 23 | 600 | n.a. |
| 2001 | n.a. | 1,200 | 23 | 600 | n.a. |
| 2002 | n.a. | 1,220 | 23 | 610 | n.a. |
| 2003 | n.a. | 1,220 | 23 | 610 | n.a. |

Source: NS Department of Energy (Prior to 2003, these resources were distributed among other departments and agencies. This is an estimate of annual ocean-related resource requirements and spending.)

### Nova Scotia Department of Tourism, Culture and Heritage

The mission of the Nova Scotia Department of Tourism, Culture and Heritage is to promote, develop and preserve Nova Scotia's significant tourism, culture and heritage potential for lasting social and economic benefits. One of the department's priorities is to create and advance a sustainable tourism development strategy for Nova Scotia's 7,600 kilometres of coastline. With much of the tourism and culture focus in Nova Scotia inextricably tied to ocean activities (fishing, nature tourism, shipping, sailing, etc.) and the natural environment (parks and beaches), one could argue that a correspondingly high proportion of the departmental budget is ocean-dependent, but what that proportion should be is not clear. The department does not track its expenditures (staff or operations) in a way that lends itself to such a division. In the absence of any empirical basis for estimating the contribution of departmental activity to the ocean economy, no estimate is put forward.

## Economic Contribution

The economic contribution of the federal and provincial government services sector in Nova Scotia is through salaries, operations and maintenance, and capital expenditures.

The public service in Nova Scotia declined substantially in the mid-1990s, following a program review within the federal government and cuts at the provincial level, both in response to rising deficits. The data in the preceding tables show that DND and DFO were particularly hard hit, with the provincial economy losing a combined 4,300 FTEs and $175 million in expenditures from these departments alone.

Though there has been some recovery of employment and income over the past few years, the contribution to GDP and household income are over $100 million below the levels of the mid-1990s. The annual contribution of the public sector to the ocean economy is summarized in Table 29.

**Table 29**
**Government Services Economic Data**

| | Expenditures $000s | GDP (1) $000s | Employment FTE | Income $000s |
|---|---|---|---|---|
| 1995 | 1,237,070 | 826,949 | 17,469 | 826,949 |
| 1996 | 1,001,732 | 645,327 | 15,746 | 645,327 |
| 1997 | 966,194 | 622,530 | 14,835 | 622,530 |
| 1998 | 990,914 | 625,349 | 14,149 | 625,349 |
| 1999 | 1,016,475 | 657,511 | 13,314 | 657,511 |
| 2000 | 1,065,430 | 678,881 | 13,226 | 678,881 |
| 2001 | 1,065,086 | 699,894 | 13,164 | 699,894 |
| 2002 | 1,073,797 | 718,550 | 13,015 | 718,550 |

Source: Tables 20-28

Note: 1. GDP measures returns to labour (income) and capital. Since the public service does not generate profit in the form of a return to capital, only wage and salary income contributes to GDP.

# 11. SUMMARY

## Direct Impacts

The value of the ocean economy almost doubled over the 1995-2001 period, with the contribution to GDP increasing from $1.5 to $2.9 billion (current dollar terms). The relatively high GDP growth after 1999 is attributable largely to offshore gas production (Table 30). While gas sales revenues serve to improve the GDP picture, employment growth has remained fairly flat. This is explained in part by the capital-intensiveness of the offshore oil and gas industry, but also by the manner in which GDP is computed.

**Table 30**
**Nova Scotia Ocean Activity Economic Data (1)**
**(dollar values in millions)**

| | Expenditures (2) $ | GDP (3) $ | Employment (4) FTE | Sales (5) $ | Exports (6) $ | Income (7) $ |
|---|---|---|---|---|---|---|
| 1995 | 2,745 | 1,526 | 34,669 | 1,900 | 1,035 | 1,228 |
| 1996 | 2,475 | 1,364 | 32,898 | 1,865 | 1,050 | 1,033 |
| 1997 | 2,540 | 1,445 | 32,516 | 2,000 | 1,060 | 1,054 |
| 1998 | 2,825 | 1,511 | 32,689 | 2,110 | 1,145 | 1,115 |
| 1999 | 3,235 | 1,747 | 33,673 | 2,210 | 1,230 | 1,284 |
| 2000 | 3,305 | 2,157 | 32,883 | 2,710 | 1,925 | 1,247 |
| 2001 | 3,285 | 2,860 | 33,673 | 3,390 | 2,495 | 1,273 |

Notes:
1. These totals are derived by summing the corresponding industry economic contribution data found in Tables 4 to 28. In order to provide annual totals, any data gaps in Tables 4 to 28 are filled using estimates based on trend data or industry relationships. The values used to fill the gaps are identified in the Appendix. Note that the totals in Table 30 differ from the Overall Total in the Appendix because the latter are adjusted for double counting.
2. Includes both capital and operating spending. This contributes to higher spending than sales revenue data.
3. Rising GDP to expenditure ratio in 2000-2001 is attributable to inclusion of the value of natural gas production in GDP figures.
4. FTE = full-time equivalent employment
5. Sales figures represent industry only. No revenue is attributed to government.
6. Export figures represent goods producing industries only. Export data for services are not available.
7. Represents household income.

## Relative Direct Impact

The relative magnitude of the ocean sector may be measured by comparing direct impacts and provincial totals for the corresponding indicators (see Table 31).

- The GDP impact declined from 7.1% to 6.3% of the Nova Scotia total between 1995 and 1998 (reflecting the cuts in federal and provincial departmental spending). The ocean sector contribution to GDP then rose sharply to 10.1% by 2001, with much of the increase accounted for by offshore gas production.

- Following the sharp decline in federal and provincial government employment in 1996, the relative impact of direct ocean sector employment has remained relatively stable, varying between 7.0 and 7.5% of the provincial total.

- Similarly, the direct income impact of ocean activities has remained stable at about 5.5% since 1996. It should be noted that ocean sector income and household income are not directly comparable because the latter includes transfer payments. Adjusting for this would cause the percentage impact to rise to the 7-8% range (in line with the relative employment impact).

**Table 31**
**Ocean Sector Direct Impact on the Nova Scotia Economy, 1995-2001**

| | Ocean Sector Direct Impact (1) | Nova Scotia Total | Ocean Sector as % of Nova Scotia |
|---|---|---|---|
| **Gross Domestic Product ($millions)** | | | |
| 1995 | 1,368 | 19,296 | 7.1 |
| 1996 | 1,221 | 19,512 | 6.3 |
| 1997 | 1,287 | 20,368 | 6.3 |
| 1998 | 1,344 | 21,401 | 6.3 |
| 1999 | 1,552 | 23,059 | 6.7 |
| 2000 | 1,958 | 24,658 | 7.9 |
| 2001 | 2,620 | 25,942 | 10.1 |
| **Employment (FTE)** | | | |
| 1995 | 31,119 | 377,100 | 8.3 |
| 1996 | 29,348 | 378,100 | 7.8 |
| 1997 | 28,966 | 384,300 | 7.5 |
| 1998 | 29,139 | 398,900 | 7.3 |
| 1999 | 30,123 | 408,600 | 7.4 |
| 2000 | 29,333 | 419,500 | 7.0 |
| 2001 | 30,123 | 423,300 | 7.1 |
| **Household Income (2) ($millions)** | | | |
| 1995 | 1,228 | 18,585 | 6.6 |
| 1996 | 1,033 | 18,639 | 5.5 |
| 1997 | 1,054 | 18,950 | 5.6 |
| 1998 | 1,115 | 20,445 | 5.5 |
| 1999 | 1,284 | 21,967 | 5.8 |
| 2000 | 1,247 | 22,955 | 5.4 |
| 2001 | 1,273 | 23,744 | 5.4 |

Source: Nova Scotia total data from *Nova Scotia Statistical Review*, 1998 and 2004, and Statistics Canada.

Notes: 1. The direct impact values in this table are those shown in the Overall Total in the Appendix, and are not the sum of the totals in the economic contribution tables in this chapter (see Table 30). The Overall Total in the Appendix represents the *net* impact of ocean industry activity. It avoids double counting by not adding the output of one industry to that of another, where the output of the first forms the major input of the second (e.g., a substantial share of fishing output forms the main input for fish processing). To illustrate the difference, the Appendix shows the gross impacts of fishing and fish processing as separate industries, as well as the *net* impact after adjustments are made.

2. The ocean sector income as a % of NS household income understates the true impact because total Nova Scotia household income includes transfer payments and other non-employment income not included in the ocean sector figures.

## Private and Public Sector Contribution

Industry and government contributed about equally to the ocean economy during the mid-1990s. Each accounted for about half of GDP and employment generated through ocean-dependent activity (Table 32). With sharp cuts in government spending affecting DND and DFO, two of the most substantial contributors to the ocean economy, the government share of ocean activity dropped to below half. At the same time, industry activity grew, with GDP rising three-fold and employment increasing by just under 20%. By 2001, industry accounted for 75% of direct GDP and 60% of employment attributable to ocean activity in Nova Scotia.

**Table 32**
**Nova Scotia Industry and Government Contributions to the Ocean Economy**
**(dollar values in millions)**

| | GDP | | | | Employment | | | |
|---|---|---|---|---|---|---|---|---|
| | Industry | | Government | | Industry | | Government | |
| | $ | % | $ | % | FTE | % | FTE | % |
| 1995 | 699 | 46 | 827 | 54 | 17,200 | 50 | 17,469 | 50 |
| 1996 | 718 | 53 | 645 | 47 | 17,152 | 52 | 15,746 | 48 |
| 1997 | 822 | 57 | 623 | 43 | 17,680 | 54 | 14,836 | 46 |
| 1998 | 885 | 59 | 625 | 41 | 18,541 | 57 | 14,148 | 43 |
| 1999 | 1,089 | 62 | 658 | 38 | 20,359 | 60 | 13,314 | 40 |
| 2000 | 1,478 | 68 | 679 | 32 | 19,657 | 60 | 13,226 | 40 |
| 2001 | 2,160 | 75 | 700 | 25 | 20,510 | 61 | 13,163 | 39 |

# IV

# OCEAN ECONOMY ECONOMIC IMPACT

## 1. METHODOLOGY

In this chapter we report the overall economic impact of ocean activities on the Nova Scotia economy. This impact is estimated using the Nova Scotia Input-Output Model (1996 version). In an input-output model each industry in the economy depends upon other industries for the supply of intermediate goods and services. These relationships are incorporated as coefficients in the model allowing it to estimate impacts resulting from a specified set of expenditures. Although the NSIO is a few years out of date, the structure of economies changes slowly. Accordingly, we believe the 1996 version presents a reasonable estimate of economic impacts for the study period. The basic question usually asked in economic impact analysis is 'What are the gross-output and income flows associated with a specified economic change?' The input-output model provides the answer by tracing the transmission of a demand shock throughout the Nova Scotia economy. In the case of the ocean economy, the demand shock takes the form of the annual expenditures by the private and public sector activities outlined in Chapter III.

- The **first step** in running an IO model is to disaggregate expenditures into industry- or commodity-specific expenditures as required by the model. Care has to be taken to eliminate double counting when one industry's output forms another's input. For example, fish processing buys much of the output of commercial fishing. We adjust the value of expenditures to ensure that the impact estimates reflect net effects only. In the impact analysis, fish processing accounts for most of the direct activity, with commercial fishing and other support activities captured as spinoff impacts (hence the large spinoff impact for processing). Given the close integration of the harvesting and processing sectors, impact results are reported for the fishing industry as a whole.
- The **second step** is to specify the source of the inputs – whether produced in Nova Scotia or imported to the province. This is important because to include imported inputs would result in an overestimation of the provincial economic activity needed to meet the direct demand in question. The offshore oil and gas industry is a good example of an activity with a substantial "leakage" of expenditures from the Nova Scotia economy. Expenditures on drill rigs, industry-specific materials and equipment, and offshore construction vessels are examples of inputs not produced in Nova Scotia. Similarly, the main elements of the contribution to GDP – the returns to and of capital – flow out of the economy and consequently do not contribute to impact. The contribution to the economy arises mainly from direct employment and indirectly through the supply of goods and services.
- The **third step** concerns reconciliation of I-O results with other data sources. The reader will note that GDP estimates in Chapter III differ from the direct GDP impacts reported in this chapter. This is mainly because the I-O model is expenditure driven and excludes the contribution that capital makes to GDP where returns to capital leak out of the economy. This difference is particularly noticeable with oil and gas where most of the return to capital flows out of the province. To facilitate comparisons with provincial data generated by Statistics Canada, we adjust the impact results for offshore oil and gas by adding GDP from Chapter III to direct GDP estimated by the I-O model.

The impacts are usually estimated in terms of increases in incomes earned by resource owners (measured by GDP) and employment. Wages and salaries plus benefits are often reported as household income, essentially the labour income component of GDP.

These impacts are usually distinguished as direct, indirect and induced.

- ***Direct impacts*** refer to effects caused by the direct purchases of project inputs. For this study, these are specified in aggregate terms by industry in Chapter III.
- ***Indirect impacts*** refer to income and employment effects arising from inter-industry purchases of goods and services.
- ***Induced impacts*** refer to the effects caused by consumer spending of incomes earned in direct and indirect activities.

In this study we follow the conventional approach and present model results as direct and spinoff impacts, where the spinoff impact is the sum of the indirect and induced activities in the economy.

# 2. ECONOMIC IMPACT

## Gross Domestic Product

The Nova Scotia ocean sector generated an overall impact on provincial GDP of $4.08 billion in 2001. This is up from $2.71 billion in 1995 (Table 33). Following a sharp drop in GDP in 1996 (attributable mainly to cuts in government departments), ocean sector GDP increased gradually through the late 1990s. It rose sharply in 1999 with development of the Sable gas project, and then increased sharply again in 2001 with the steep rise in the value of natural gas production.

The magnitude of the spinoff impact indicates the multiplier has declined from 2.0 in the 1990s to about 1.5 in 2001. In other words, for every $1.00 of GDP currently generated in the ocean sector, a total of $1.50 is generated in the overall economy. The decline is due to the growing influence of oil and gas revenues. These cause direct GDP to increase substantially, but because they trigger limited spinoff activity, the multiplier effect grows proportionately smaller (see Figure 6).

**Table 33**
**Nova Scotia Ocean Sector GDP Impact, 1996-2001**
**($000s)**

| | Direct | Spinoff | Overall Impact |
|---|---|---|---|
| 1995 | 1,368,552 | 1,343,070 | 2,711,622 |
| 1996 | 1,220,753 | 1,230,688 | 2,451,441 |
| 1997 | 1,287,402 | 1,287,667 | 2,575,069 |
| 1998 | 1,344,002 | 1,440,681 | 2,784,683 |
| 1999 | 1,552,304 | 1,663,960 | 3,216,264 |
| 2000 | 1,958,074 | 1,421,646 | 3,379,720 |
| 2001 | 2,619,406 | 1,463,724 | 4,083,130 |

Source: Appendix

Offshore oil and gas leads the private sector contribution to GDP, accounting for a 33.5% share of the overall ocean GDP in 2001 (Table 34, Figure 6 and the Appendix). The fishing industry is a close second at 24.1%. The large spinoff impact in the fishing industry is attributable to the indirect effect of commercial fishing as the main input to fish processing. The Departments of National Defence and Fisheries and Oceans lead the public sector (29.2% of total).

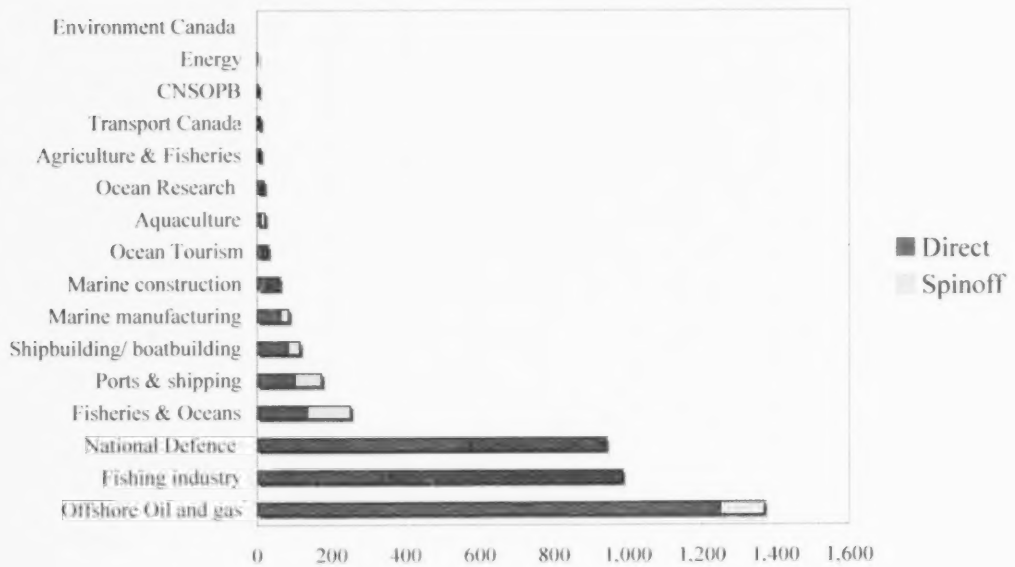
**Table 34**
**Nova Scotia Ocean Sector GDP Impact by Activity, 2001**
**($000s)**

| | Direct | Spinoff | Overall Impact | % of total |
|---|---|---|---|---|
| **Private Sector** | | | | |
| Offshore Oil and gas | 1,250,292 | 119,252 | 1,369,544 | 33.5 |
| Fishing industry | 361,729 | 623,873 | 985,602 | 24.1 |
| Ports & shipping | 101,200 | 72,801 | 174,001 | 4.3 |
| Shipbuilding/ boatbuilding | 83,930 | 32,338 | 116,268 | 2.8 |
| Marine manufacturing | 63,000 | 22,190 | 85,190 | 2.1 |
| Marine construction | 31,644 | 28,956 | 60,600 | 1.5 |
| Ocean Tourism | 17,567 | 11,703 | 29,270 | 0.7 |
| Aquaculture | 10,150 | 12,368 | 22,518 | 0.6 |
| **Public Sector** | | | | |
| National Defence | 571,725 | 369,300 | 941,025 | 23.0 |
| Fisheries & Oceans | 103,478 | 148,928 | 252,406 | 6.2 |
| Ocean Research | 9,450 | 10,038 | 19,488 | 0.5 |
| Agriculture & Fisheries | 5,687 | 4,240 | 9,927 | 0.2 |
| Transport Canada | 5,079 | 3,571 | 8,650 | 0.2 |
| CNSOPB | 2,564 | 2,456 | 5,020 | 0.1 |
| Energy | 1,200 | 1,059 | 2,259 | 0.1 |
| Environment Canada | 711 | 651 | 1,362 | 0.0 |
| **Total** | **2,619,406** | **1,463,724** | **4,083,130** | **100.0** |

Note: fishing industry includes commercial fishing and fish processing.

**Figure 6**

**Nova Scotia Ocean Sector GDP Impact by Activity, 2001 ($millions)**



## Employment

The Nova Scotia ocean sector generated an overall employment impact of 58,677 full-time equivalent jobs in 2001. The impact has remained fairly stable at this level since 1996, except at the height of offshore gas activity in 1999 when jobs peaked at 66,558. The sharp drop in 1996 was due to government spending cuts affecting all departments, with DND and DFO particularly hard hit. The annual employment impact is shown in Table 35. The magnitude of the spinoff impact indicates an implied multiplier of about 1.9 in moving from direct to overall impacts.

**Table 35**
**Nova Scotia Ocean Sector Employment Impact, 1995-2001**
**(FTEs)**

| | Direct | Spinoff | Overall Impact |
|---|---|---|---|
| 1995 | 31,119 | 30,576 | 61,695 |
| 1996 | 29,348 | 27,790 | 57,138 |
| 1997 | 28,966 | 28,815 | 57,781 |
| 1998 | 29,139 | 31,659 | 60,798 |
| 1999 | 30,123 | 36,435 | 66,558 |
| 2000 | 29,333 | 28,537 | 57,870 |
| 2001 | 30,123 | 28,554 | 58,677 |

The fishing industry accounted for 41.0% of overall employment attributable to the ocean sector in 2001, with over half of the total in fishing and other support services. The Departments of National Defence and Fisheries and Oceans led the public sector contribution with a combined 38.2% share. The overall employment impact by activity for 2001 is shown in Table 36 and depicted in Figure 7. Employment impacts by ocean activity by year are given in the Appendix.

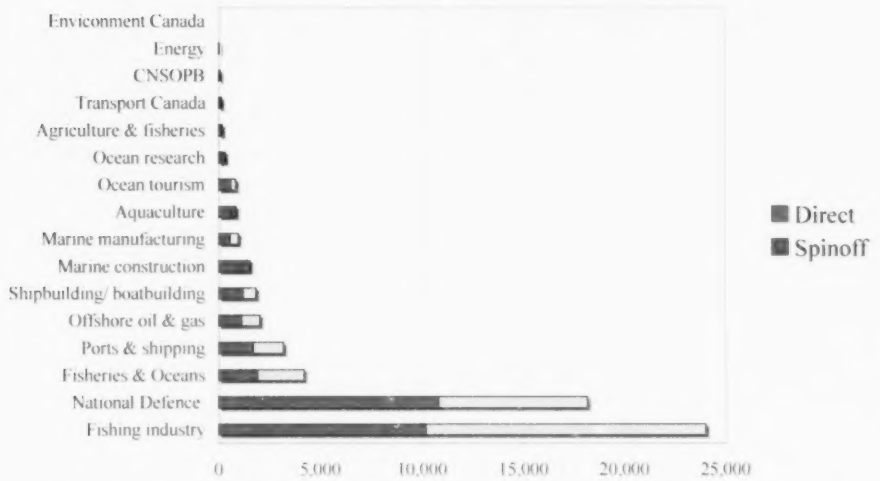
**Table 36**
**Nova Scotia Ocean Sector Employment Impact by Activity, 2001**
**(FTE)**

| | Direct | Spinoff | Overall Impact | % of total |
|---|---|---|---|---|
| **Private Sector** | | | | |
| Fishing industry | 10,231 | 13,828 | 24,059 | 41.0 |
| Ports & shipping | 1,719 | 1,475 | 3,194 | 5.4 |
| Offshore Oil and gas | 1,140 | 914 | 2,054 | 3.5 |
| Shipbuilding and boatbuilding | 1,200 | 646 | 1,846 | 3.2 |
| Marine construction | 886 | 655 | 1,541 | 2.6 |
| Marine Manufacturing | 550 | 437 | 987 | 1.7 |
| Aquaculture | 628 | 251 | 879 | 1.5 |
| Ocean Tourism | 606 | 242 | 848 | 1.4 |
| **Public Sector** | | | | |
| National Defence | 10,840 | 7,362 | 18,202 | 31.0 |
| Fisheries & Oceans | 1,920 | 2,308 | 4,228 | 7.2 |
| Ocean Research | 145 | 203 | 348 | 0.6 |
| Agriculture & Fisheries | 114 | 82 | 196 | 0.3 |
| Transport Canada | 77 | 69 | 146 | 0.3 |
| CNSOPB | 34 | 48 | 82 | 0.1 |
| Energy | 23 | 21 | 44 | 0.1 |
| Environment Canada | 10 | 13 | 23 | 0.0 |
| **Total** | **30,123** | **28,554** | **58,677** | **100.0** |

Note: fishing industry includes commercial fishing and fish processing.

**Figure 7**

**Nova Scotia Ocean Sector Employment Impact, 2001 (FTE)**




Note: fishing industry includes commercial fishing and fish processing

## Household Income

The Nova Scotia ocean sector generated a household income impact of $2.15 billion in 2001. This is up from $2.09 billion in 1995 (Table 37). The impact of offshore development is evident from the rise in income in 1998 and 1999, with a decline thereafter as offshore activity moved from construction to operation. The subsequent drop in offshore activity led to a decline in household income, but was offset to some extent by rising incomes in the military and increased earnings in the fishing industry.

**Table 37**
**Nova Scotia Ocean Sector Household Income Impact, 1996-2001**
**($000s)**

| | Direct | Spinoff | Overall Impact |
|---|---|---|---|
| 1995 | 1,167,254 | 922,523 | 2,089,777 |
| 1996 | 977,501 | 850,281 | 1,827,782 |
| 1997 | 993,527 | 893,573 | 1,887,100 |
| 1998 | 1,050,861 | 1,004,318 | 2,055,178 |
| 1999 | 1,208,973 | 1,163,405 | 2,372,377 |
| 2000 | 1,170,285 | 962,161 | 2,132,446 |
| 2001 | 1,179,539 | 966,290 | 2,145,829 |

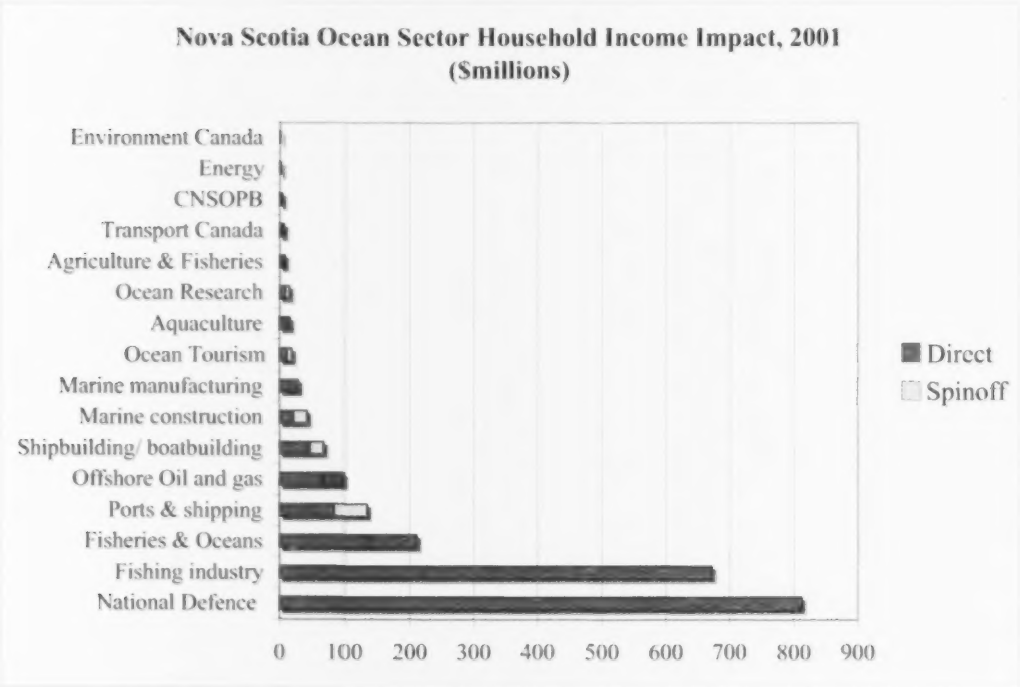
The fishing industry generated $672.6 million in household income, accounting for 31.3% of the ocean sector total. This is particularly important to the province, given the largely rural nature of the industry. Ports and shipping and offshore oil and gas were a distant second and third, accounting for 6.3% and 4.6% respectively. While the size of the offshore oil and gas figures may surprise some, the contribution at $100 million is significant though relatively small because the sector is in its production phase with limited numbers of income earners employed either directly or indirectly. The Departments of National Defence and Fisheries and Oceans led the public sector contribution with a combined

47.8% share. The overall household income impact by activity for 2001 is shown in Table 38, with relative positions depicted in Figure 8.

**Table 38**
**Nova Scotia Ocean Sector Household Income Impact by Activity, 2001**
**($000s)**

| | Direct | Spinoff | Overall Impact | % of total |
|---|---|---|---|---|
| **Private Sector** | | | | |
| Fishing industry | 220,489 | 452,080 | 672,569 | 31.3 |
| Ports & shipping | 85,950 | 48,215 | 134,165 | 6.3 |
| Offshore Oil and gas | 68,292 | 29,893 | 98,185 | 4.6 |
| Shipbuilding and boatbuilding | 48,000 | 21,134 | 69,134 | 3.2 |
| Marine construction | 22,151 | 21,403 | 43,554 | 2.0 |
| Marine manufacturing | 15,053 | 14,287 | 29,340 | 1.4 |
| Ocean Tourism | 11,410 | 7,924 | 19,334 | 0.9 |
| Aquaculture | 8,300 | 8,220 | 16,520 | 0.8 |
| **Public Sector** | | | | |
| National Defence | 571,725 | 240,681 | 812,406 | 37.9 |
| Fisheries & Oceans | 103,478 | 108,204 | 211,682 | 9.9 |
| Ocean Research | 9,450 | 6,644 | 16,094 | 0.7 |
| Agriculture & Fisheries | 5,687 | 2,675 | 8,362 | 0.4 |
| Transport Canada | 5,079 | 2,252 | 7,331 | 0.3 |
| CNSOPB | 2,564 | 1,584 | 4,148 | 0.1 |
| Energy | 1,200 | 682 | 1,882 | 0.1 |
| Environment Canada | 711 | 412 | 1,123 | 0.1 |
| **Total** | **1,179,539** | **966,290** | **2,145,829** | **100.0** |

**Figure 8**



## Impacts in a Nova Scotia Context

When direct as well as spinoff impacts are taken into consideration, the ocean sector clearly makes a substantial contribution to the Nova Scotia economy.

- **GDP**: Overall, the ocean sector share of provincial GDP has remained fairly stable since 1996, following the sharp drop in government spending starting in 1996. Offshore oil and gas activity caused a slight increase in the ocean sector impact from about 12% of total GDP to just under 14% in 1999. The impact of offshore gas revenue on GDP is evident in 2001, with the ocean sector climbing to a 15.7% share of provincial GDP (Table 39).

- **Employment**: followed a similar pattern to 1999, with the ocean sector share of total provincial employment steady in the 15-16% range. It dropped to the 14.0% range thereafter, due largely to the slowdown in offshore activity.

- **Household Income**: The ocean sector share of Nova Scotia household income held steady in the 10-11% range between 1995 and 1999, then declined to the 9.5% range in 2000.

**Table 39**
**Ocean Sector Overall Impact on the Nova Scotia Economy, 1996-2001**

| | Ocean Sector Overall Impact | Nova Scotia Total | Ocean Sector as % of Nova Scotia |
|---|---|---|---|
| **Gross Domestic Product ($millions)** | | | |
| 1995 | 2,712 | 19,296 | 14.1 |
| 1996 | 2,451 | 19,512 | 12.6 |
| 1997 | 2,575 | 20,368 | 12.6 |
| 1998 | 2,785 | 21,401 | 13.0 |
| 1999 | 3,216 | 23,059 | 13.9 |
| 2000 | 3,380 | 24,658 | 13.7 |
| 2001 | 4,083 | 25,942 | 15.7 |
| **Employment (FTE)** | | | |
| 1995 | 61,695 | 377,100 | 16.3 |
| 1996 | 57,138 | 378,100 | 15.1 |
| 1997 | 57,781 | 384,300 | 15.0 |
| 1998 | 60,798 | 398,900 | 15.2 |
| 1999 | 66,558 | 408,600 | 16.2 |
| 2000 | 57,870 | 419,500 | 13.8 |
| 2001 | 58,677 | 423,300 | 13.9 |
| **Household Income ($millions)** | | | |
| 1995 | 2,090 | 17,917 | 11.7 |
| 1996 | 1,828 | 18,121 | 10.1 |
| 1997 | 1,887 | 18,454 | 10.2 |
| 1998 | 2,055 | 19,930 | 10.3 |
| 1999 | 2,372 | 21,409 | 11.1 |
| 2000 | 2,132 | 22,384 | 9.5 |
| 2001 | 2,146 | 23,173 | 9.3 |

Source: Nova Scotia total data from Nova Scotia Statistical Review, 1998 and 2004, and Statistics Canada.

# V

# OCEAN ECONOMY IN PERSPECTIVE

## 1. NOVA SCOTIA IN AN ATLANTIC REGION CONTEXT

### Private Sector

Nova Scotia makes a strong showing in terms of its relative share of output (sales value) and employment in the ocean economy of the Atlantic region (the Atlantic Provinces plus Quebec). Table 40 shows that Nova Scotia's ocean economy accounts for 25% of the total value of production and just over 37% of employment. The comparisons in Table 40 are based on data from this study and Atlantic regional data drawn from a national study completed in 2003.[8]

Nova Scotia's relative strength in fishing (35-40% of activity) and fish processing (25-30%) arises from the productive and diverse resource base, with the concentration of high valued species such as lobster, scallop, snow crab and surf clam. Aquaculture is a relatively moderate performer (20-25% of activity) in a regional sector dominated by New Brunswick salmon and PEI mussels and oysters.

Nova Scotia is one of the two provinces with offshore oil and gas production, but lags behind Newfoundland with its substantial oil production. Nova Scotia's relatively strong showing in port activity is due mainly to Halifax, Canada's third largest container port (by volume). The port and shipping industry is dominated by Quebec, with its strength both in port activities (mainly Montreal) and shipping.

Assessing the relative strength of the tourism industry is complicated by the lack of comprehensive and reliable data at both the provincial and regional level. Taking the recreational fishing and cruise ship sectors only, Nova Scotia fares relatively well, accounting for about 30% of total spending in the region.

The shipbuilding and boatbuilding sector also occupies a relatively strong position, accounting for 25-30% of activity. Comparing marine construction and manufacturing is problematic, since it is not clear that consistent industry definitions are used.

### Public Sector

With the presence of Canada's largest military base (CFB Halifax) and the regional administration for Fisheries and Oceans, Nova Scotia accounts for 30% of expenditures and almost 65% of employment in regional public sector ocean activities (Table 40).

The Nova Scotia – Atlantic split between private and public sector activities in terms of relative value of production in the ocean economy is broadly comparable (roughly 75:25). In the case of employment, the private-public split is 60:40 for Nova Scotia vs. 70:30 for the Atlantic region.

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[8] RASCL, *Canada's Ocean Industries: Contribution to the Economy, 1988-2000*, prepared for the Department of Fisheries and Oceans, 2003. To allow a direct comparison, data for 2000 are used.

**Table 40**
**Nova Scotia in the Atlantic Regional Oceans Economy, 2000**

| Industry | Nova Scotia | | Atlantic Region | | Nova Scotia as % of Atlantic Region | |
|---|---|---|---|---|---|---|
| | Output ($ millions) | Employment (FTE) | Output ($ millions) | Employment (FTE) | Output (%) | Employment (%) |
| **Private sector** | | | | | | |
| Fishing | 648.0 | 7,500 | 1,713.5 | 18,500 | 37.8 | 40.5 |
| Fish processing | 850.0 | 5,579 | 2,988.0 | 17,500 | 28.4 | 31.9 |
| Aquaculture | 43.5 | 640 | 159.5 | 3,500 | 27.3 | 18.3 |
| Oil and Gas | 769.0 | 1,600 | 5,265.1 | 5,910 | 14.6 | 27.1 |
| Ports and shipping | 138.6 | 1,644 | 376.8 | n.a. | 36.8 | n.a. |
| Tourism | 34.0 | 533 | 113.9 | n.a. | 29.9 | n.a. |
| Marine construction | 49.7 | 500 | 261.3 | 1,375 | 19.0 | 36.4 |
| Manufacturing | 110.0 | 525 | 186.3 | n.a. | 59.0 | n.a. |
| Ship and boat building | 118.0 | 940 | 426.7 | 3,630 | 27.7 | 25.9 |
| Sub-total | 2,760.8 | 19,461 | 11,491.1 | 50,415.0 | 24.0 | 38.6 |
| **Public sector** | | | | | | |
| Federal government | 1,050.1 | 13,075 | 3,376.0 | 20,300 | 31.1 | 64.4 |
| Provincial government | 16.6 | 151 | 130.9 | 880 | 12.7 | 17.2 |
| Sub-total | 1,066.7 | 13,226 | 3,506.9 | 21,180.0 | 30.4 | 62.4 |
| Total | 3,827.5 | 33,390 | 14,998.0 | 71,595.0 | 25.5 | 46.6 |
| **Relative share** | **%** | **%** | **%** | **%** | | |
| Private | 72.1 | 59.5 | 76.6 | 70.4 | | |
| Public | 27.9 | 40.5 | 23.4 | 29.6 | | |

Source: Chapter III and RASCL, *Canada's Ocean Industries: Contribution to the Economy, 1988-2000,* Tables 4.8 (b) and 4.9.
Note: Output values are generally not additive because industry outputs may form inputs to another industry (e.g., fishing and fish processing). They are added here simply to allow order of magnitude estimates of relative importance to be derived.

### Relative impact in other jurisdictions

Canada's coastal provinces and jurisdictions elsewhere have conducted assessments of the economic impact of ocean activities (Table 41). These estimates are broadly comparable from a methodological perspective, though not all jurisdictions carry the estimates beyond the direct impact stage. Also, there are differences in approach to estimating tourism impacts. These are conservatively estimated in the U.K. and Canada, while in Australia, tourism is the single most important ocean sector.

Among the provinces, ocean activity is of greatest relative significance in Nova Scotia and Newfoundland, due largely to the offshore oil and gas and fisheries sectors. The fishing industry and tourism account for PEI's relative strength, while New Brunswick's impact is due mainly to its fishing industry. The fishing industry, though considerably reduced from its scale in the 1980s, continues to lead ocean activities in British Columbia. The relative impact is lowest in Quebec with shipping and construction the dominant activities.

**Table 41**
**Value of Ocean Activities in Selected Economies**

| Jurisdiction | Year | Ocean direct GDP as % of total GDP | Dominant sectors |
|---|---|---|---|
| Canada (1) | 2000 | 1.5 | ▪ Oil and gas<br>▪ Fishing industry |
| United Kingdom (2) | 1999-2000 | 3.6 | ▪ Oil and gas<br>▪ Leisure |
| Australia (3) | 1994 | 8.0 | ▪ Leisure |
| **Nova Scotia** | **2001** | **10.1** | ▪ **Oil and gas**<br>▪ **Fishing industry** |
| Newfoundland (4) | 1997-1999 | 14.1 | ▪ Oil and gas<br>▪ Fishing industry |
| Prince Edward Island (5) | 1997-1999 | 10.0 | ▪ Fishing industry<br>▪ Tourism |
| New Brunswick (6) | 1995-1997 | 4.3 | ▪ Fishing industry<br>▪ Tourism |
| British Columbia (7) | 2000 | 2.5 | ▪ Fishing industry<br>▪ Mfg & services |
| Quebec (8) | 1998 | 0.8 | ▪ Shipping<br>▪ Construction |

Source: 1. and 7. RASCL, *Canada's Ocean Industries: Contribution to the Economy, 1988-2000*
2. Pugh and Skinner, *A New Analysis of Marine-Related Activities in the UK Economy*, 2002
3. National Oceans Office, Australia'a Ocean Policy, 1994
4. Government of Newfoundland and Labrador, *Estimating the Value of the Marine, Coastal and Ocean Resources of Newfoundland and Labrador*, 2002.
5. and 6. Canmac Economics et al., *The Value of the Ocean Sector to the Economy of Prince Edward Island*, 2002.
8. Université du Québec a Rimouski, *Estimation de la Valeur Economique des Industries Associées au Domaine Maritime au Québec*, 2002.

# 2. GROWTH POTENTIAL

## Private sector

### Commercial fisheries

Limited growth is expected in commercial fisheries over the next decade. Following several years of expansion in the quantity and value of landings of shellfish species, indications are that the resource is reaching limits of sustainability at current catch levels. Lobster, crab and shrimp stocks are heavily fished, though there may be some growth in scallop and surf clam fisheries. Most groundfish stocks continue to show limited signs of recovery following the collapse in the early 1990s. Haddock off southwest Nova Scotia is the one exception, with a strong year class likely to support an expanded fishery over the next decade.

With management measures restricting the number of participants in the fisheries generally, and with transferable quotas providing an incentive for efficiencies in the amount of capital in the industry, the number of active vessels and employment are expected to remain stable and possible decline. On balance, with several fisheries operating with record levels of landings, the risk is higher for a downturn than continued expansion.

### Aquaculture

Aquaculture is still in a developmental stage in Nova Scotia and faces numerous challenges including the need for expanded research and development, access to suitable sites and financing. Setbacks in the past few years include a recent outbreak of disease in oyster beds in the Bras d'Or Lakes and the bankruptcy of a major trout producer. Nonetheless, there is considerable optimism in the industry that these and other challenges will be overcome and with improved management and a more supportive regulatory regime, the industry will continue to develop and grow. Industry observers suggest that output could increase by 50% over the next decade as sites are more effectively utilized and new sites come into development. Sources of growth include salmon, halibut and blue mussel.

### Fish processing

The future of fish processing is tied closely to conditions in the commercial fisheries, particularly groundfish, which historically has provided much of the raw material for processing operations. Though improved resource conditions for haddock provide some optimism for strengthening the processing sector, this is set against increasingly competitive conditions in the international markets for groundfish that local processors have relied on for the past 15 years. Rising input prices coupled with adverse shifts in exchange rates (making Canadian fish exports more expensive) and increasing competitive pressures from China, suggest that the processing sector is headed for even more challenging conditions over the next decade. Employment and household income are likely to decline from recent levels, in part due to these international conditions, but also in part to increasing mechanization of the sector and the challenges processing companies face in recruiting workers in smaller communities.

### Offshore oil and gas

Completion of the Sable project (Tier 2) and development of the Deep Panuke field in the next few years are the bright spots on a horizon currently offering limited basis for optimism. Recent exploration activity has yielded no significant results, and given the high cost of exploring for and producing natural gas on the Scotian Shelf, interest in the region is declining. The contribution to the economy is expected to remain at current levels over the balance of the decade, with relatively stable gas production based on tying in known discoveries to the SOEP system.

With natural gas demand in the U.S. rising faster than supplies can be brought on stream, we expect a renewed in interest in the Scotian Shelf in the post-2010 period, resulting in a resurgence of exploration activity. Clearly, much more work needs to be done to understand the geology under the seabed off Nova Scotia. Experience elsewhere indicates there is reason for optimism that further commercial discoveries will be made leading to developments similar to SOEP, and resulting in economic impacts of the same magnitude.

### Marine transportation

Stable average activity, based on some losses and gains, forms the most likely growth path for the marine transportation sector. Some gains are possible with increased shipments of resource materials (gypsum and aggregate), vehicles and dry bulk through the main ports, Halifax and Port Hawkesbury. Expansion of the cruise ship industry is also expected to continue, with positive impacts in the Halifax and Sydney areas. Nova Scotia may also benefit within the decade from the development of a liquefied natural gas (LNG) terminal in the Port Hawkesbury area.

The potential for loss also exists with changing circumstances in the container shipping industry. Though container traffic is expanding and the industry shifting to larger vessels (both of which favour Halifax), Halifax could be adversely affected by increased competition from New York and Norfolk as these ports deepen their harbours and expand their facilities. The net effect of these positive and negative influences remains unclear.

### Ocean tourism

Nova Scotia has much to offer tourists interested in an ocean experience. Cruise ship calls at Nova Scotia ports have increased substantially over the past decade and are expected to show continued growth (albeit at more modest rates) in the coming years. The Halifax Port Authority is trying to attract a cruise line to use Halifax as a home port, and if successful, this could greatly increase the level of tourism in the province.

Coastal tourism is also expected to grow over the next decade as an increasing number of visitors and Nova Scotians take advantage of the wide array of coastal attractions the province has to offer (kayaking tours, beaches, marinas and marine nature walks). As noted earlier in the report, if the province wishes to have reliable measures of the scale and impact of coastal tourism, it must initiate systematic and rigorous analysis of this sector. Recreational fishing is expected to remain stable or possibly decline slightly pending the recovery of fish stocks.

### Shipbuilding and boatbuilding

Stability, with the potential for modest growth, is the most likely path for this sector. There had been considerable optimism about sector growth arising from offshore development, but this now seems remote given the recent downturn in that industry. Demand for the shipbuilding industry (more accurately, ship repair) will continue to come from two main sources: commercial cargo vessels and the federal government. Several DND and Coast Guard vessels also need replacement, though where this construction takes place is a matter of federal policy. Taken together, the refit and replacement contracts would mean steady work for Halifax Industries, if the yard is successful in the bidding process.

Demand for the boatbuilding industry arises from two sources: the fishing industry and the pleasure craft market. With no significant expansion in the number of fishing vessels for the domestic market, this source of demand is defined by replacement needs, repair and maintenance, and a slowly growing export market. The pleasure craft market also represents a growing source of potential, with boat builders targeting both the domestic and export segments.

### Marine manufacturing

The manufacture of devices for ocean use (mainly defence and scientific applications) occupies a relatively small niche in the province's manufacturing sector. Output is expected to remain fairly stable with just modest growth in the demand drivers (public sector budgets, including defence). Growth of the export market offers some potential, though strong international competition in this sector presents major challenges.

### Marine construction

The Departments of Fisheries and Oceans and National Defence account for most of the marine construction in Nova Scotia. The level work is expected to moderate over the next decade as responsibility for funding for on-going repair and maintenance of wharf facilities in small craft harbours shifts to local harbour authorities, and as some of the major projects at CFB Halifax are completed. A marine facility for an LNG plant in the Strait of Canso is also a possibility within the next 5-10 years.

## *Public sector*

Following the major cuts in federal and provincial spending in 1995-1996, there has been very little change in annual expenditures by department. Table 29 in Chapter III shows that annual expenditures hovered around the $1.0 billion mark between 1996 and 2001. Wages and salaries account for about 70% of this total, varying little over the period. Reviewing departmental mandates and projections reveals little that would suggest the flat trend is likely to change appreciably one way or the other over the next decade.

In considering trends for key departments and agencies, some factors to consider include:

### National Defence

DND officials indicate that unless mandate and type and number of operational platforms change, then there is limited basis for change in personnel, the main expenditure driver in the military. Though the federal government has indicated it intends to restore some of the cuts to the military made in the mid-1990s, there is no indication that any increase in funding would affect the east coast naval force in ways not already incorporated in spending levels. Even the Maritime Helicopter Program is not expected to elevate staffing and expenditures above current levels.

### Fisheries and Oceans

The increasing emphasis on the fishing industry taking greater responsibility for fisheries management, coupled with increasing reliance on technology for monitoring fishing vessel activity, suggest that operational budgets for DFO could decline further over the next decade. Moreover, a continuing decline in spending on marine research would also contribute to a reduction in DFO's role in the ocean economy. On the other hand, much could change over a decade, and it is not out of the question that Nova Scotia could benefit from increased decentralization (away from Ottawa) of DFO responsibilities.

### Nova Scotia Department of Agriculture and Fisheries

Much of the Department's role and impact arises from regulation and inspection related to fish processing and aquaculture. With the potential for an expansion of aquaculture in the province, some increase in Departmental activities and ocean impact could also occur.

### Nova Scotia Department of Energy

Initial geological theories on offshore oil and gas, especially in deepwater, have not played out as expected. Private sector geologists are working to reinterpret their data and theories based upon new drilling information. With encouraging exploration activity being a major priority for the Department of Energy and rising government offshore revenues, it might be expected the Department will see at least modest increase in effort resulting in increased expenditures and employment levels in this area in coming years.. The costs associated with regulating the offshore remain significant with respect to the Sable Offshore Energy Project. The Department's budget for the Canada Nova Scotia Offshore Petroleum Board (50% cost shared with federal government less industry recoveries) is therefore forecast to be stable for the foreseeable future.

# *APPENDIX*

## *Ocean Activity Annual Impact Results*

## PRIVATE SECTOR

**(Employment in full-time equivalent jobs. Household Income and GDP in $000s)**

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **COMMERCIAL FISHING** | | | | | | | | | |
| 1995 | 7,500 | 128,000 | 235,612 | 3,806 | 114,015 | 299,450 | 11,306 | 242,015 | 535,062 |
| 1996 | 7,500 | 116,500 | 214,360 | 3,424 | 103,855 | 272,460 | 10,924 | 220,355 | 486,820 |
| 1997 | 7,500 | 128,000 | 235,520 | 3,720 | 114,107 | 299,355 | 11,220 | 242,107 | 534,875 |
| 1998 | 7,500 | 135,750 | 249,780 | 3,880 | 121,016 | 317,480 | 11,380 | 256,766 | 567,260 |
| 1999 | 7,500 | 158,500 | 291,640 | 4,524 | 141,296 | 370,686 | 12,024 | 299,796 | 662,326 |
| 2000 | 7,500 | 162,000 | 298,080 | 4,506 | 144,416 | 378,870 | 12,006 | 306,416 | 676,950 |
| 2001 | 7,500 | 196,250 | 361,100 | 5,351 | 174,948 | 458,972 | 12,851 | 371,198 | 820,072 |
| **FISH PROCESSING** | | | | | | | | | |
| 1995 | 5,221 | 112,883 | 173,234 | 13,324 | 399,137 | 542,742 | 18,545 | 512,020 | 715,976 |
| 1996 | 4,951 | 104,130 | 204,308 | 12,966 | 393,239 | 534,208 | 17,917 | 497,369 | 738,516 |
| 1997 | 5,000 | 105,958 | 247,700 | 13,718 | 420,832 | 571,294 | 18,718 | 526,790 | 818,994 |
| 1998 | 5,128 | 107,785 | 229,700 | 13,918 | 434,061 | 589,145 | 19,046 | 541,846 | 818,845 |
| 1999 | 5,528 | 118,721 | 296,680 | 15,002 | 468,586 | 636,177 | 20,530 | 587,307 | 932,857 |
| 2000 | 5,579 | 103,178 | 251,940 | 11,950 | 383,006 | 520,433 | 17,529 | 486,184 | 772,373 |
| 2001 | 6,281 | 117,250 | 241,520 | 12,067 | 394,504 | 536,854 | 18,348 | 511,754 | 778,374 |
| **FISHING INDUSTRY – NET IMPACT*** | | | | | | | | | |
| 1995 | 9,171 | 180,218 | 251,638 | 14,578 | 436,690 | 599,498 | 23,749 | 616,908 | 851,136 |
| 1996 | 8,901 | 165,416 | 275,668 | 14,093 | 427,418 | 585,865 | 22,994 | 592,834 | 861,533 |
| 1997 | 8,950 | 173,293 | 326,104 | 14,942 | 458,385 | 628,050 | 23,892 | 631,678 | 954,154 |
| 1998 | 9,078 | 179,197 | 312,851 | 15,195 | 473,888 | 649,338 | 24,273 | 653,085 | 962,189 |
| 1999 | 9,478 | 202,101 | 393,766 | 16,491 | 515,087 | 706,457 | 25,969 | 717,188 | 1,100,223 |
| 2000 | 9,529 | 188,399 | 351,170 | 13,433 | 430,534 | 592,265 | 22,962 | 618,933 | 943,435 |
| 2001 | 10,231 | 220,489 | 361,729 | 13,828 | 452,080 | 623,873 | 24,059 | 672,569 | 985,602 |

* Impact estimates for fishing and fish processing are shown separately. They cannot be added to derive total fishing industry impact because fishing forms the major input to the processing industry. To add the full impact of each sector would be to double count fishing activity. To avoid double counting, processing sector purchases from the fishing industry are netted out when estimating overall fishing industry impact.

## Private Sector, Cont'd

**(Employment in full-time equivalent jobs. Household Income and GDP in $000s)**

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **AQUACULTURE*** | | | | | | | | | |
| 1995 | 450 | 3,800 | 4,500 | 150 | 4,503 | 6,747 | 600 | 8,303 | 11,247 |
| 1996 | 575 | 4,000 | 5,500 | 176 | 5,327 | 7,964 | 751 | 9,327 | 13,464 |
| 1997 | 512 | 4,300 | 5,690 | 188 | 5,752 | 8,598 | 700 | 10,052 | 14,288 |
| 1998 | 700 | 6,500 | 9,480 | 283 | 8,827 | 13,190 | 983 | 15,327 | 22,670 |
| 1999 | 708 | 8,200 | 17,625 | 266 | 8,320 | 12,513 | 974 | 16,520 | 30,138 |
| 2000 | 640 | 8,900 | 21,600 | 343 | 11,000 | 16,470 | 983 | 19,900 | 38,070 |
| 2001 | 628 | 8,300 | 10,150 | 251 | 8,220 | 12,368 | 879 | 16,520 | 22,518 |
| **OFFSHORE OIL AND GAS**** | | | | | | | | | |
| 1995 | 212 | 16,041 | 71,597 | 397 | 18,656 | 26,932 | 609 | 34,697 | 98,530 |
| 1996 | 241 | 18,170 | 78,505 | 451 | 21,203 | 30,617, | 692 | 39,373 | 109,122 |
| 1997 | 450 | 34,432 | 101,488 | 1,026 | 41,402 | 59,456 | 1,476 | 75,835 | 160,945 |
| 1998 | 1,177 | 93,715 | 155,843 | 3,421 | 115,695 | 164,702 | 4,597 | 209,411 | 320,545 |
| 1999 | 2,218 | 177,575 | 219,989 | 6,758 | 221,167 | 314,355 | 8,976 | 398,743 | 534,344 |
| 2000 | 1,600 | 132,506 | 646,506 | 1,680 | 53,858 | 124,208 | 3,280 | 186,364 | 770,714 |
| 2001 | 1,140 | 68,292 | 1,250,292 | 914 | 29,893 | 119,252 | 2,054 | 98,185 | 1,369,544 |
| **PORTS AND SHIPPING** | | | | | | | | | |
| 1995 | 1,525 | 68,600 | 94,265 | 1,286 | 38,515 | 58,152 | 2,811 | 107,115 | 152,417 |
| 1996 | 1,585 | 72,900 | 97,840 | 1,333 | 40,438 | 61,100 | 2,918 | 113,338 | 158,940 |
| 1997 | 1,797 | 84,400 | 110,900 | 1,510 | 46,319 | 70,031 | 3,307 | 130,719 | 180,931 |
| 1998 | 1,500 | 68,000 | 100,000 | 1,467 | 45,752 | 68,398 | 2,967 | 113,752 | 168,398 |
| 1999 | 1,679 | 82,270 | 116,500 | 1,183 | 36,955 | 56,629 | 2,862 | 119,225 | 173,129 |
| 2000 | 1,644 | 82,200 | 104,100 | 1,310 | 41,979 | 63,758 | 2,954 | 124,179 | 167,858 |
| 2001 | 1,719 | 85,950 | 101,200 | 1,475 | 48,215 | 72,801 | 3,194 | 134,165 | 174,001 |

* Shaded areas indicate direct values are estimated by the consultant using available data.

**Economic impacts are simulated on total development phase expenditures of the Sable Offshore Energy Project. They are allocated on an annual basis in fixed proportions by commodity using aggregate annual expenditure data reported by the Canada-Nova Scotia Offshore Petroleum Board. Because expenditure patterns by commodity are not consistent through the development phase (e.g., engineering expenses as a portion of the annual total does not remain constant) the impacts for each year are not strictly accurate but they will sum to the correct whole.

## Private Sector, Cont'd

(Employment in full-time equivalent jobs. Household Income and GDP in $000s)

| | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **OCEAN TOURISM** | | | | | | | | | |
| 1995 | 250 | 4,703 | 7,241 | 151 | 4,525 | 6,598 | 401 | 9,228 | 13,839 |
| 1996 | 274 | 5,153 | 7,934 | 157 | 4,753 | 6,940 | 431 | 9,906 | 14,874 |
| 1997 | 300 | 5,650 | 8,700 | 163 | 5,005 | 7,320 | 463 | 10,655 | 16,020 |
| 1998 | 328 | 6,183 | 9,520 | 169 | 5,275 | 7,725 | 497 | 11,458 | 17,245 |
| 1999 | 463 | 8,728 | 13,440 | 210 | 6,565 | 9,662 | 673 | 15,293 | 23,102 |
| 2000 | 533 | 10,035 | 15,450 | 227 | 7,273 | 10,722 | 760 | 17,308 | 26,172 |
| 2001 | 606 | 11,410 | 17,567 | 242 | 7,924 | 11,703 | 848 | 19,334 | 29,270 |
| **SHIPBUILDING AND REPAIR AND BOATBUILDING** | | | | | | | | | |
| 1995 | 988 | 39,527 | 69,191 | 706 | 21,153 | 31,910 | 1,694 | 60,680 | 101,101 |
| 1996 | 988 | 39,527 | 69,191 | 697 | 21,153 | 31,910 | 1,685 | 60,680 | 101,101 |
| 1997 | 988 | 39,527 | 69,191 | 690 | 21,153 | 31,910 | 1,678 | 60,680 | 101,101 |
| 1998 | 1,040 | 41,600 | 72,820 | 706 | 22,039 | 33,267 | 1,746 | 63,639 | 106,087 |
| 1999 | 988 | 39,527 | 69,191 | 677 | 21,153 | 31,910 | 1,665 | 60,680 | 101,101 |
| 2000 | 940 | 37,600 | 66,015 | 612 | 19,631 | 29,665 | 1,552 | 57,231 | 95,680 |
| 2001 | 1,200 | 48,000 | 83,930 | 646 | 21,134 | 32,338 | 1,846 | 69,134 | 116,268 |
| **MARINE MANUFACTURING** | | | | | | | | | |
| 1995 | 450 | 12,316 | 21,600 | 228 | 6,851 | 10,742 | 678 | 19,167 | 32,342 |
| 1996 | 450 | 12,316 | 19,800 | 216 | 6,560 | 10,296 | 666 | 18,876 | 30,096 |
| 1997 | 450 | 12,316 | 18,400 | 200 | 6,172 | 9,702 | 650 | 18,488 | 28,102 |
| 1998 | 475 | 13,000 | 33,400 | 305 | 9,523 | 14,849 | 780 | 22,523 | 48,249 |
| 1999 | 500 | 13,684 | 36,600 | 475 | 14,859 | 23,039 | 975 | 28,543 | 59,639 |
| 2000 | 525 | 14,368 | 49,500 | 372 | 11,919 | 18,548 | 897 | 26,287 | 68,048 |
| 2001 | 550 | 15,053 | 63,000 | 437 | 14,287 | 22,190 | 987 | 29,340 | 85,190 |

* Shaded areas indicate direct values are estimated by the consultant using available data.

## Private Sector, Cont'd

(Employment in full-time equivalent jobs. Household Income and GDP in $000s)

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **MARINE CONSTRUCTION** | | | | | | | | | |
| 1995 | 604 | 15,100 | 21,571 | 487 | 14,589 | 19,738 | 1,091 | 29,689 | 41,309 |
| 1996 | 588 | 14,692 | 20,988 | 468 | 14,195 | 19,204 | 1,056 | 28,887 | 40,192 |
| 1997 | 683 | 17,079 | 24,399 | 538 | 16,502 | 22,325 | 1,221 | 33,581 | 46,724 |
| 1998 | 693 | 17,317 | 24,739 | 525 | 16,732 | 22,636 | 1,218 | 34,049 | 47,375 |
| 1999 | 775 | 19,377 | 27,682 | 599 | 18,723 | 25,330 | 1,374 | 38,100 | 53,012 |
| 2000 | 696 | 17,396 | 24,852 | 524 | 16,810 | 22,740 | 1,220 | 34,206 | 47,592 |
| 2001 | 886 | 22,151 | 31,644 | 655 | 21,403 | 28,956 | 1,541 | 43,554 | 60,600 |

## PUBLIC SECTOR

**(Employment in full-time equivalent jobs. Household Income and GDP in $000s)**

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **DEPARTMENT OF NATIONAL DEFENCE** | | | | | | | | | |
| 1995 | 13,829 | 666,448 | 666,448 | 9,481 | 284,002 | 437,570 | 23,310 | 950,450 | 1,104,018 |
| 1996 | 12,966 | 518,346 | 518,346 | 7,389 | 224,080 | 344,348 | 20,355 | 742,426 | 862,694 |
| 1997 | 12,141 | 495,884 | 495,884 | 7,178 | 220,214 | 337,292 | 19,319 | 716,098 | 833,176 |
| 1998 | 11,891 | 515,238 | 515,238 | 7,378 | 230,086 | 352,181 | 19,269 | 745,324 | 867,419 |
| 1999 | 11,108 | 545,684 | 545,684 | 7,497 | 234,184 | 359,103 | 18,605 | 779,868 | 904,787 |
| 2000 | 10,917 | 558,281 | 558,281 | 7,172 | 229,861 | 355,058 | 18,089 | 788,142 | 913,339 |
| 2001 | 10,840 | 571,725 | 571,725 | 7,362 | 240,681 | 369,300 | 18,202 | 812,406 | 941,025 |
| **DEPARTMENT OF FISHERIES AND OCEANS** | | | | | | | | | |
| 1995 | 3,321 | 144,796 | 144,796 | 2,788 | 83,504 | 130,366 | 6,109 | 228,300 | 275,162 |
| 1996 | 2,460 | 110,648 | 110,648 | 2,479 | 75,195 | 116,994 | 4,939 | 185,843 | 227,642 |
| 1997 | 2,378 | 110,348 | 110,348 | 2,057 | 63,104 | 97,669 | 4,435 | 173,452 | 208,017 |
| 1998 | 1,930 | 92,443 | 92,443 | 1,862 | 65,666 | 97,589 | 3,792 | 158,109 | 190,032 |
| 1999 | 1,845 | 91,238 | 91,238 | 1,890 | 74,271 | 106,214 | 3,735 | 165,509 | 197,452 |
| 2000 | 1,915 | 97,862 | 97,862 | 2,446 | 125,862 | 167,473 | 4,361 | 223,724 | 265,335 |
| 2001 | 1,920 | 103,478 | 103,478 | 2,308 | 108,204 | 148,928 | 4,228 | 211,682 | 252,406 |
| **TRANSPORT CANADA** | | | | | | | | | |
| 1995 | 74 | 4,036 | 4,036 | 71 | 2,124 | 3,358 | 145 | 6,160 | 7,394 |
| 1996 | 74 | 4,036 | 4,036 | 70 | 2,124 | 3,358 | 144 | 6,160 | 7,394 |
| 1997 | 74 | 4,036 | 4,036 | 69 | 2,124 | 3,358 | 143 | 6,160 | 7,394 |
| 1998 | 74 | 4,036 | 4,036 | 68 | 2,124 | 3,358 | 142 | 6,160 | 7,394 |
| 1999 | 75 | 4,422 | 4,422 | 66 | 2,050 | 3,248 | 141 | 6,472 | 7,670 |
| 2000 | 75 | 4,461 | 4,461 | 60 | 1,936 | 3,072 | 135 | 6,397 | 7,533 |
| 2001 | 77 | 5,079 | 5,079 | 69 | 2,252 | 3,571 | 146 | 7,331 | 8,650 |

## Public Sector, Cont'd

(Employment in full-time equivalent jobs. Household Income and GDP in $000s)

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **ENVIRONMENT CANADA** | | | | | | | | | |
| 1995 | 10 | 696 | 696 | 14 | 406 | 641 | 24 | 1,102 | 1,337 |
| 1996 | 10 | 696 | 696 | 13 | 406 | 641 | 23 | 1,102 | 1,337 |
| 1997 | 10 | 696 | 696 | 13 | 406 | 641 | 23 | 1,102 | 1,337 |
| 1998 | 10 | 696 | 696 | 13 | 406 | 641 | 23 | 1,102 | 1,337 |
| 1999 | 10 | 696 | 696 | 13 | 406 | 641 | 23 | 1,102 | 1,337 |
| 2000 | 10 | 726 | 726 | 13 | 432 | 682 | 23 | 1,158 | 1,408 |
| 2001 | 10 | 711 | 711 | 13 | 412 | 651 | 23 | 1,123 | 1,362 |
| **OCEANS RESEARCH** | | | | | | | | | |
| 1995 | 90 | 4,500 | 4,500 | 106 | 3,164 | 4,780 | 196 | 7,664 | 9,280 |
| 1996 | 100 | 5,175 | 5,175 | 120 | 3,640 | 5,500 | 220 | 8,815 | 10,675 |
| 1997 | 92 | 4,950 | 4,950 | 113 | 3,480 | 5,259 | 205 | 8,430 | 10,209 |
| 1998 | 100 | 5,625 | 5,625 | 127 | 3,956 | 5,977 | 227 | 9,581 | 11,602 |
| 1999 | 132 | 7,650 | 7,650 | 172 | 5,379 | 8,127 | 304 | 13,029 | 15,777 |
| 2000 | 158 | 9,450 | 9,450 | 207 | 6,644 | 10,038 | 365 | 16,094 | 19,488 |
| 2001 | 145 | 9,450 | 9,450 | 203 | 6,644 | 10,038 | 348 | 16,094 | 19,488 |
| **NS DEPARTMENT OF AGRICULURE AND FISHERIES** | | | | | | | | | |
| 1995 | 107 | 4,526 | 4,526 | 92 | 2,766 | 4,366 | 199 | 7,292 | 8,892 |
| 1996 | 98 | 4,438 | 4,438 | 86 | 2,596 | 4,101 | 184 | 7,034 | 8,539 |
| 1997 | 100 | 4,454 | 4,454 | 85 | 2,618 | 4,135 | 185 | 7,072 | 8,589 |
| 1998 | 97 | 4,717 | 4,717 | 93 | 2,915 | 4,601 | 190 | 7,632 | 9,318 |
| 1999 | 92 | 4,819 | 4,819 | 85 | 2,643 | 4,179 | 177 | 7,462 | 8,998 |
| 2000 | 96 | 4,885 | 4,885 | 83 | 2,657 | 4,202 | 179 | 7,542 | 9,087 |
| 2001 | 114 | 5,687 | 5,687 | 82 | 2,675 | 4,240 | 196 | 8,362 | 9,927 |

## Public Sector, Cont'd

(Employment in full-time equivalent jobs. Household Income and GDP in $000s)

| Year | Direct | | | Spinoff | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| **CANADA-NOVA SCOTIA OFFSHORE PETROLEUM BOARD** | | | | | | | | | |
| 1995 | 15 | 982 | 982 | 18 | 527 | 820 | 33 | 1,509 | 1,802 |
| 1996 | 15 | 953 | 953 | 20 | 605 | 937 | 35 | 1,558 | 1,890 |
| 1997 | 18 | 1,127 | 1,127 | 21 | 649 | 1,008 | 39 | 1,776 | 2,135 |
| 1998 | 23 | 1,469 | 1,469 | 25 | 794 | 1,236 | 48 | 2,263 | 2,705 |
| 1999 | 29 | 1,802 | 1,802 | 31 | 960 | 1,494 | 60 | 2,762 | 3,296 |
| 2000 | 32 | 2,016 | 2,016 | 34 | 1,083 | 1,686 | 66 | 3,099 | 3,702 |
| 2001 | 34 | 2,564 | 2,564 | 48 | 1,584 | 2,456 | 82 | 4,148 | 5,020 |
| **NS DEPARTMENT OF ENERGY** | | | | | | | | | |
| 1995 | 23 | 965 | 965 | 23 | 548 | 852 | 46 | 1,513 | 1,817 |
| 1996 | 23 | 1,035 | 1,035 | 22 | 588 | 913 | 45 | 1,623 | 1,948 |
| 1997 | 23 | 1,035 | 1,035 | 22 | 588 | 913 | 45 | 1,623 | 1,948 |
| 1998 | 23 | 1,125 | 1,125 | 22 | 639 | 993 | 45 | 1,764 | 2,118 |
| 1999 | 23 | 1,200 | 1,200 | 22 | 682 | 1,059 | 45 | 1,882 | 2,259 |
| 2000 | 23 | 1,200 | 1,200 | 21 | 682 | 1,059 | 44 | 1,882 | 2,259 |
| 2001 | 23 | 1,200 | 1,200 | 21 | 682 | 1,059 | 44 | 1,882 | 2,259 |
| | | | | | | | | | |
| **OVERALL TOTAL** | | | | | | | | | |
| Year | Direct | | | Spinoff | | | Total | | |
| | Employment | HH Income | GDP | Employment | HH Income | GDP | Employment | HH Income | GDP |
| 1995 | 31,119 | 1,167,254 | 1,368,552 | 30,576 | 922,523 | 1,343,071 | 61,695 | 2,089,777 | 2,711,622 |
| 1996 | 29,348 | 977,501 | 1,220,753 | 27,790 | 850,281 | 1,230,688 | 57,138 | 1,827,782 | 2,451,441 |
| 1997 | 28,966 | 993,527 | 1,287,402 | 28,815 | 893,874 | 1,287,668 | 57,781 | 1,887,100 | 2,575,069 |
| 1998 | 29,139 | 1,050,861 | 1,344,002 | 31,659 | 1,004,318 | 1,440,681 | 60,798 | 2,055,178 | 2,784,683 |
| 1999 | 30,123 | 1,208,973 | 1,552,304 | 36,435 | 1,163,405 | 1,663,960 | 66,558 | 2,372,377 | 3,216,264 |
| 2000 | 29,333 | 1,170,285 | 1,958,074 | 28,537 | 962,161 | 1,421,646 | 57,870 | 2,132,446 | 3,379,720 |
| 2001 | 30,123 | 1,179,539 | 2,619,406 | 28,554 | 966,290 | 1,463,724 | 58,677 | 2,145,829 | 4,083,130 |

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